

**MARY K MINE (AKA BLACK PINE MINE)
INCLUDING ADJACENT UNNAMED HYDRAULIC MINE
AND 17 CLAIMS**

**PRELIMINARY ASSESSMENT AND SITE
INSPECTION REPORT**

Idaho County
State of Idaho



Department of Environmental Quality

March 2012

Submitted to:
U. S. Environmental Protection Agency
Region 10
1200 Sixth Avenue
Seattle, WA 98101

This page intentionally left blank for double-sided printing.



STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

1410 North Hillton • Boise, Idaho 83706 • (208) 373-0502

C L "Butch" Otter, Governor
Curt Fransen, Director

March 14, 2012

Mr. Kevin Tomlinson
Black Swan Development
171 Hwy 95 North
Grangeville, ID 83530

Subject: Preliminary Assessment and Site Inspection Report for the
Mary K Mine (aka Black Pine Mine) Including Adjacent Unnamed
Hydraulic Mine and 17 Claims, Elk City Mining District,
Idaho County, Idaho

Dear Mr. Tomlinson:

The Idaho Department of Environmental Quality (DEQ) has completed a review of historical mining data and geological information for the above referenced mine, located near Elk City, Idaho. On September 21, 2011 DEQ conducted a site visit to the Mary K Mine and an adjacent hydraulically mined area. During the site visit, mining activities such as waste dumps, collapsed adits, water conveyance ditches, and collapsed shafts were observed and mapped in order to provide a comprehensive analysis necessary to complete a Preliminary Assessment and Site Inspection Report.

Preliminary assessments are conducted by DEQ according to the Federal Comprehensive Environmental Response, Compensation and Liabilities Act (CERCLA). The reasons to complete a preliminary assessment (PA) include:

- 1) To identify those sites which are not CERCLIS caliber because they do not pose a threat to public health or the environment (NRAP);
- 2) To determine if there is a need for removal actions or other programmatic management of sites;
- 3) To determine if a Site Investigation, which is a more detailed site characterization, is needed; and/or
- 4) To gather data to facilitate later evaluation of the release of hazardous substances through the Hazard Ranking System (HRS).

Mr. Kevin Tomlinson
March 14, 2012
Page 2

DEQ completes PAs under contract with the U.S. Environmental Protection Agency in order to identify risks to human health and the environment, and make recommendations to land owners regarding how risks might be managed, if necessary.

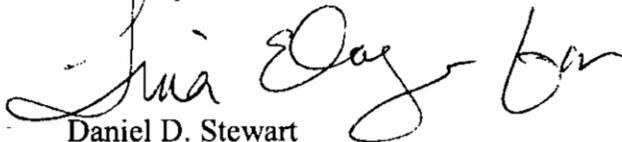
Generally speaking, toxicological risks to human and ecological receptors are unlikely at the Mary K Mine and claims. This is due to the lack of residences or structures and limited use of this area by the public. The area is well vegetated and stable. Airborne, water, and soil pathways presently do not exist.

Based on existing conditions, data observations, chemistry results, and potential pathways of contaminants to receptors, potential exposures to ecological and human receptors do not pose a threat at this time. **This information was used by DEQ to recommend the Mary K Mine and associated claims and hydraulically mined area be designated as NRAP.**

Attached is the Preliminary Assessment and Site Inspection Report for the Mary K Mine (aka Black Pine Mine) Including Adjacent Unnamed Hydraulic Mine and 17 Claims. It contains some history of the claims, limited geological information, photographs of mining activity, and maps of the property

DEQ looks forward to addressing any questions you may have regarding our findings. Please contact me (208-983-0808) if you have any comments, questions, or if I may be of any other assistance. Thank you for granting us access to the property.

Sincerely,



Daniel D. Stewart
Watershed Monitoring Coordinator

Attachment

cc: Ken Marcy – U.S. Environmental Protection Agency
Mary K Mine File

Table of Contents

Table of Contents	i
List of Tables	ii
List of Figures	iii
List of Photographs	iv
List of Acronyms	v
Section 1. Introduction.....	7
Section 2. Ownership.....	11
Section 3. Overview and Location.....	15
3.1 Location	15
3.2 Directions to the Mine	15
Section 4. Mine Site History.....	17
Section 5. Climatology.....	19
Section 6. General Geology	21
Section 7. Current and Potential Future Land Uses.....	25
Section 8. Mine Site Conditions	27
8.1 Unnamed Hydraulically Mine Area.....	27
8.2 Mary K Mine	30
Section 9. Sample Collection and Analysis	37
9.1 Collection.....	37
9.2 Soil Sample Analysis	41
9.3 Water Quality Sample Analysis.....	43
Section 10. Pathways and Environmental Hazards.....	45
10.1 Ground Water Pathways	45
10.2 Surface Water Pathways	45
10.3 Domestic Wells and Public Water Supplies	45
10.4 Air Quality Pathways.....	50
10.5 Soil Exposures	50
10.6 Residences, Schools, and Day Care Facilities	50
10.7 Wetlands	50
10.8 Sensitive, Rare, and Threatened Species (Plant and Animal).....	50
10.9 Fisheries	55
10.10 Sensitive Waterways.....	55
10.11 Livestock Receptors.....	55
Section 11. Summary and Conclusions	61
Section 12. References.....	63
Appendix A. Laboratory Sample Reports.....	65

List of Tables

Table 1. Mary K Mine Background and Waste Dump Soil Sample Analysis.....	42
Table 2. Wildlife and Livestock Risk Management Criteria for Metals in Soils (mg/kg).....	43
Table 3. Total Recoverable Metals Analysis in Surface Water – Mary K Mine Site.....	44

List of Figures

Figure 1. Topographic Overview Map of the Mary K Mine and Unnamed Hydraulic Mining Area.....	9
Figure 2. Aerial Photograph Overlain by Idaho County Parcel Data for Bennett Lumber Products, Inc.	13
Figure 3. Map of Major Lithology in the Vicinity of the Mary K Mine and Claims	23
Figure 4. Sample Locations and Features of the Mary K Mine.....	39
Figure 5. Map of the Source Water Delineation Including the 15-Mile Surface Water TDL for the Mary K Mine	47
Figure 6. Sensitive Species In and Around the Mary K Mine and Claims; Species of Concern Listed are Plants and Animals	53
Figure 7. Fisheries Within 4-Mile Radius and in the Vicinity of the Mary K Mine and Claims	57
Figure 8. State of Idaho 303(d) Map for Impaired Waters Not Supporting Cold Water Aquatic Life and Salmonid Spawning Due to Temperature	59

List of Photographs

Photo 1. High wall on southeast portion of hydraulically mine area.....	27
Photo 2. North by northwest portion of high wall pit.....	28
Photo 3. Bottom of high wall pit.....	28
Photo 4. Collapsed adit on the north side of the pit in the hydraulically mined area.	29
Photo 5. Collapsed adit north of the hydraulic pit area.....	29
Photo 6. Collapsed shaft near the adits in the hydraulically mined area.	30
Photo 7. Collapsed Adit 1 of the Mary K Mine.....	31
Photo 8. Boggy area of Mary K Mine Adit 1.	32
Photo 9. Orange stained water at the entrance of what remains of Mary K Mine Adit 1.....	32
Photo 10. Water conveyance ditch running perpendicular to Mary K Mine Adit 1.....	33
Photo 11. Possibly an air pipe from the underground mine workings located just to the side of Adit 1.	33
Photo 12. Collapsed shaft north of Adit 1.....	34
Photo 13. Mary K Mine collapsed Adit 2 (facing north) directly above Adit 1.....	34
Photo 14. Mary K Mine collapsed Adit 2 (facing west).....	35

List of Acronyms

ATV	all-terrain vehicle
BLM	U.S. Bureau of Land Management
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CWA	Clean Water Act
DEQ	Idaho Department of Environmental Quality
EPA	U.S. Environmental Protection Agency
ESU	Ecologically Significant Unit
GIS	Geographic Information System
HHSLs	Human Health Medium-Specific Screening Levels
HRS	Hazard Ranking Score
IDFG	Idaho Department of Fish and Game
IDTLs	Initial Default Target Levels
MCL	maximum contaminant level
NAIP	National Agriculture Imagery Program
NRAP	No Remedial Action Planned
PA	preliminary assessment
PPE	probable point of entry
ppm, mg/kg, mg/L	parts per million, milligrams per kilograms, milligrams per Liter
PWS	public water system
RMP	Risk Management Plan
SI	site inspection
SVL	Silver Valley Laboratories, Inc.

TDL	target distance limit
TMDL	total maximum daily load
TOT	time of travel
USFS	U.S. Forest Service
USGS	U.S. Geological Survey

Section 1. Introduction

This report presents the results of the Preliminary Assessment and Site Inspection (PA/SI) for the Mary K Mine (aka Black Pine Mine) and claims including an adjacent unnamed hydraulically mined area approximately one-third mile southeast of the Mary K Mine. These mines are located within the Elk City Mining District. The Idaho Department of Environmental Quality (DEQ) is contracted by Region 10 of the U.S. Environmental Protection Agency (EPA) to provide technical support for completion of preliminary assessments at various mines on private or state lands and/or those areas that have mixed ownership (public and private).

DEQ also completes site assessments in response to complaints or information about sites possibly contaminated with hazardous waste. These sites include abandoned mines, rural airfields that have served as bases for aerial spraying, old landfills, illegal dumps, and abandoned industrial facilities with known or suspected releases.

In February 2002, DEQ initiated a Preliminary Assessment Program to evaluate and prioritize assessment of such potentially contaminated sites. Due to accessibility and funding considerations, priority is given to sites where potential contamination poses the most substantial threat to human health or the environment. In recent years this priority focuses DEQ's efforts in areas where residential and recreational developments are encroaching on historic mining districts. Priority is also given to mining districts where groups or clusters of sites, like those found in the Mary K Mine and claims, can be cost effectively assessed on a watershed basis.

See the following web page for additional information about DEQ's Preliminary Assessment Program: <http://www.deq.idaho.gov/waste-mgmt-remediation/remediation-activities/mining-preliminary-assessments.aspx>

The Mary K Mine and the adjacent unnamed hydraulically mined area are located on patented claims on privately held lands (Figure 1). DEQ was unable to find the names of the 17 claims referenced in the document "Geology and Ore Deposits of the Elk City, Orogrande, Buffalo Hump, and Tenmile Districts, Idaho County, Idaho: U.S. Geological Survey Circular 9" written by P.J Shenon and J.C. Reed, 1934. DEQ contacted the BLM General Land Office to find the claim names, but BLM did not have records for those claims. DEQ also went to the Idaho County Courthouse and was unable to find any records regarding the claim names.

The Mary K Mine contains two adits with numerous claims associated with the mine. The adjacent unnamed hydraulically mined area encompasses approximately 10 acres of disturbed area and presumably is part of the Mary K Mine and claims. It includes a hydraulic high wall, collapsed tunnels, a collapsed shaft, and water conveyance ditches. On September 21, 2011 DEQ visited the claims and performed a site assessment. These claims are located within the much larger mining area of the Elk City Mining District.

DEQ would like to Mr. Kevin Tomlinson of Black Swan Development, a representative for Bennett Lumber Products, for permitting access to the mine site. DEQ did not purposely or knowingly trespass on any private holdings.

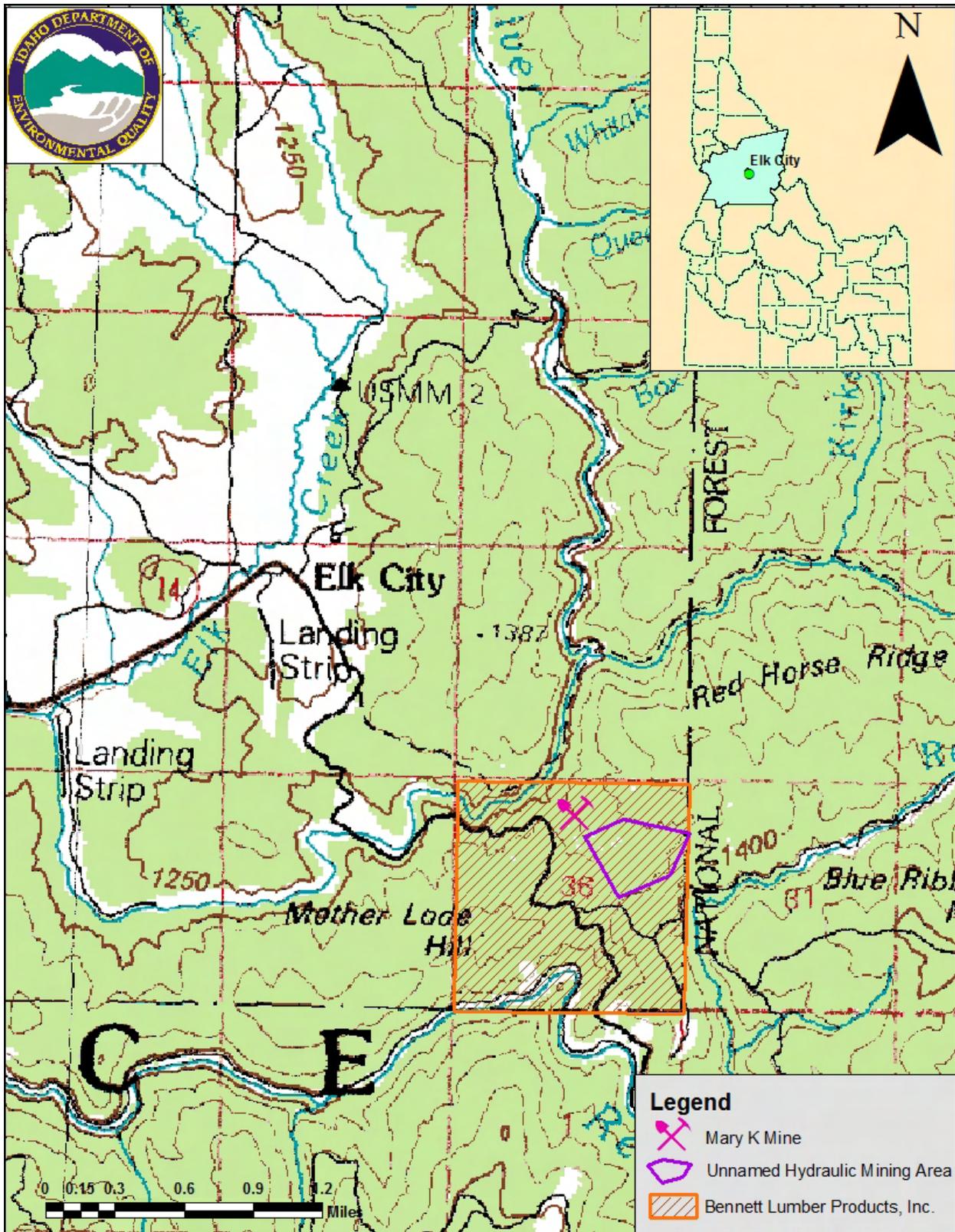


Figure 1. Topographic Overview Map of the Mary K Mine and Unnamed Hydraulic Mining Area

(Map Source: USGS 100k Quads)

This page intentionally left blank for double-sided printing.

Section 2. Ownership

DEQ does not warrant the ownership research or location of property boundaries contained in this report. The information regarding ownership and property boundaries was obtained from the Idaho County Assessor's Office and the U.S. Bureau of Land Management (BLM) General Land Office (GLO) records (Figure 2). This area has a mixture of federal, private, private industrial, and State of Idaho ownership.

During the site assessments, DEQ used references from several different documents including U.S. Geological Survey (USGS) maps, county tax rolls, and historical reports that had numerous spellings for claim names, town sites, and/or geographic features. DEQ's use of the different spellings is to remain in context with the reference used for each given section of text or written in this report.

The Mary K Mine and claims are owned by Bennett Lumber Products, Inc. Bennett Lumber Products owns Section 36 of Township 29 North, Range 8 East which includes the Mary K Mine and claims and the unnamed hydraulic mine.

Within the following ownership description the "**Partial Determination**" is meant to convey a very brief summary of DEQ's assessment of individual claims and parcels relative to human health and ecological risk factors associated with toxicological responses to mine wastes. A determination of No Remedial Action Planned or "**NRAP**" means based on current conditions at the site, DEQ did not find any significant evidence that would indicate the potential of adverse toxicological effects to human or ecological receptors on the parcel of land and, therefore no additional work is necessary to manage those potential effects. This determination says nothing about risks associated with physical hazards such as open adits, open shafts, high walls, or unstable ground.

A determination of "**Calculate HRS**" indicates DEQ has determined there is sufficient evidence to warrant calculation of a "**Hazard Ranking Score**" (HRS) by EPA's contractors. It also indicates DEQ has made significant conclusions and recommendations that additional site assessment and/or remedial actions are necessary to prevent adverse effects to human or ecological receptors. The conclusions and recommendations for the Mary K Mine and claims are in Section 11 of this report.

<u>Owner</u>	<u>Parcel Number</u>	<u>Partial Determination</u>
Bennett Lumber Products Inc. 171 Hwy 95 North Grangeville, ID 83530	29N08E360010	NRAP

This page intentionally left blank for double-sided printing.



Figure 2. Aerial Photograph Overlain by Idaho County Parcel Data for Bennett Lumber Products, Inc.

(Map Source: 2009 Natural Color 1-meter National Agriculture Imagery Program (NAIP) Idaho)

This page intentionally left blank for double-sided printing.

Section 3. Overview and Location

3.1 Location

The Mary K Mine is located 1.5 air miles (straight line) and 2.7 miles by road southeast of the town of Elk City in Idaho County, Idaho. The mine is on the east hillside 100 feet above Glass Creek at an elevation of approximately 4200 feet. The Mary K Mine is in Section 36 of Township 29 North, Range 8 East of the Boise Meridian at Latitude 45.81312°N and Longitude -115.41182°W. The unnamed hydraulic mine area is in the same township, range, and section at Latitude 45.81208°N and Longitude -115.40052°W.

3.2 Directions to the Mine

Access to the Mary K Mine and claims, which are patented claims, was granted to DEQ by Kevin Tomlinson of Black Swan Development. The data and observations made during the site visit have been used to come to specific conclusions regarding this private property and to some extent regarding cumulative effects of all public and private mining properties in the watershed.

To access the Mary K Mine from Elk City, head south from Elk City on U.S. Forest Service (USFS) Road 1818 (Mother Lode Road to Red River) for approximately 2.7 miles, then proceed on foot northwest for approximately 0.1 mile to the mine. Several all-terrain vehicle (ATV) trails and old roads exist on the property and access via one of these with an ATV is from USFS Road 9832.

To access the unnamed hydraulically mined area, turn on USFS Road 9832 and travel approximately one mile east from the Mary K Mine. The hydraulically mined area lies to the west and in close proximity of the road.

This page intentionally left blank for double-sided printing.

Section 4. Mine Site History

DEQ utilizes historical research for several purposes. Initially, historical information highlights potential contaminants of concerns, the magnitude of waste sites, and potentially dangerous physical hazards such as open adits and shafts. DEQ also uses the information to properly identify mine and mill facilities, unravel inconsistencies that may exist in property boundaries and ownership, and historical land uses that coincide with mining.

The historical information helps DEQ understand the relative levels of production, commodities, potential waste types etc. necessary to prepare for site assessment field work. As indicated in the history, the Mary K Mine and claims encompasses additional areas besides the Mary K Mine. No historical information specific to the hydraulically mined area was found.

DEQ realizes many of the mine sites described in the histories are particularly important to both the federal government and State of Idaho. This information documents the relative importance of historic mining districts and workings as they are re-evaluated from the perspective of economics, multiple land use, human health, and ecological risks.

Numerous sources were used during the “desktop” research prior to visiting the site. Most notably were the articles on the history and geology written by Thomson and Ballard (1924) and Shenon and Reed (1934). DEQ could not improve or expound upon these reports by writing additional historical or geological text, therefore they were directly referenced and cited.

Shenon and Reed (1934) reported:

The Mary K mine, formerly the Black Pine, of Richard Kleesattle is 1.8 miles southeast of Elk City on the Elk City-Dixie road. The property is supposed to have been worked first by Jack Williams, who about 1916 leased it to the Black Pine Mining Co. At the end of about 3 years the lease ran out and the property reverted to Williams, who sold it to the present owner. The mine is inactive now but Kleesattle reports that he has milled about 400 tons of ore in the 5-stamp mill.

The property includes 17 claims and is developed on five levels by about 2,400 feet of accessible workings. Parts of the mine, including one whole level, are at present inaccessible. The first and fourth levels are adits, but the portal of the first level is now caved. Most of the work has been on the main or fourth level, about 1,750 feet of which is now open. A raise has been driven from the fourth to the first level from a point about 1,060 feet from the portal of the fourth. The station at the top of the raise is caved, so that the first level is completely inaccessible. The second and third levels are turned from the raise. About 1,200 feet from the portal of the fourth level a 20-foot winze has been sunk and from this is turned the fifth level, which consists of about 130 feet of drift. There has been some old work on the property, and one old shaft is reported to connect

with the present first level. There are also about a dozen prospect pits and trenches on the surface along what appears to be the outcrop of the vein.

Additional information provided by Shenon and Reed (1934) related to the Tiernan Hill diggings. This site is located within the Mary K Mine claims and is less than one half mile southwest of the Mary K Mine adits.

At the old Tiernan Hill diggings, on the divide at the head of Glass Creek, just northwest of Red Horse Creek and about 3 miles southeast of Elk City, over 100 feet of unconsolidated sediments lie on gneiss bedrock. The altitude is higher than that of most of the big pits, being between 4,400 and 4,500 feet. The sediments comprise interbedded sand, clay, and gravel. Much of the ground along Glass Creek to the American River has been washed as "skim ground."

Section 5. Climatology

As reported in the South Fork Clearwater River Subbasin Assessment and TMDLs (DEQ 2002):

Northern Idaho is dominated by Pacific maritime air masses and prevailing westerly winds. Over 85 percent of the annual precipitation occurs during the fall, winter, and spring months. Cyclonic storms consisting of a series of frontal systems moving east produce long duration, low intensity precipitation during this period of the year. In winter and spring, this inland maritime regime is characterized by prolonged gentle rains, fog, cloudiness, and high humidity; with deep snow accumulations at higher elevations. Winter temperatures are often 15 to 25 °F warmer than the continental locations of the same latitude. The climate during the summer months is influenced by stationary high pressure systems over the northwest coast. This warm dry system results in only 10-15 percent of the annual precipitation falling during the summer.

The nearest climatic data is from Elk City, Idaho which is approximately 1.5 air miles (straight line) from the Mary K Mine and claims. Elk City is at an elevation of 4097 feet at the airport, while the mine site is at approximately 4200 feet. The mean annual temperature is 41.3 degrees Fahrenheit and the mean annual precipitation is 30.2 inches. The number of days with temperatures greater than 90 degrees Fahrenheit per year is 12.2 days.

This page intentionally left blank for double-sided printing.

Section 6. General Geology

Thomson and Ballard (1924) reported:

Another type of property which was visited is the Black Pine, two miles east of Elk City. Here two parallel quartz veins striking N. 75 E., and dipping 70 N., have been opened by a series of adit-tunnels. The veins vary in width from one to five feet and are traceable on the surface for several thousand feet. The ore is typical vein quartz, showing galena, sphalerite, and pyrite. The gold occurs principally with the pyrite, but is also to a small extent associated with the galena and sphalerite. Specimens were collected showing visible particles of free gold completely included in both sphalerite and galena. These veins are not large and the values are irregularly distributed but they are typical of numerous veins of the country from which in the aggregate, a considerable gold production could be expected under favorable conditions.

Shenon and Reed (1934) reported:

The Black Pine mine is mica gneiss, of which two distinct types may be recognized. The first 280 feet of the adit passes through biotite augen gneiss, the "eyes" of which range from less than half an inch to 2 inches in length. A length of half an inch may approach the average. The "eyes" appear to be of feldspar chiefly, but some may be aplite or pegmatite. The rest of the mine is in quart-biotite gneiss that locally is much crumpled. In some places, notable in the inclusions of gneiss in the vein and in the wall rock near the end of the accessible part of the main tunnel, the gneiss appears to be partly replaced by pegmatite.

The gneiss strikes northwest N. 30 degrees W. may be an average and dips 18 degrees-75 NE. The gneiss is cut by a fault that strikes about N. 75 degrees E. and dips 45 degrees-70 NW. This fault is in part occupied by the vein.

The vein is first exposed about 800 feet from the portal of the main adit and continues throughout the accessible workings. Apparently the first 800 feet of the adit was driven along the fissure where it contained little vein material. The maximum observed thickness of the vein was about 6 feet, and it seems to thin most conspicuously at places where its strike changes. As the ubiquitous gouge on both sides of the vein and striations and "plucking pits" on the surfaces between the gouge and the vein proper furnish abundant evidence of postvein faulting, in general roughly parallel to the strike of the veins, it seems likely the lenses may be due partly to this faulting. In some places the vein material is pegmatite, but in most places it is quartz, and to tell where one begins and the other ends is difficult.

The ore minerals observed were sphalerite, galena, pyrite and native gold. According to the owner, and in keeping with observations throughout the district, the gold appears most closely associated with the first two, particularly the galena.

Figure 3 is a map of the major lithology in the vicinity of the Mary K Mine.

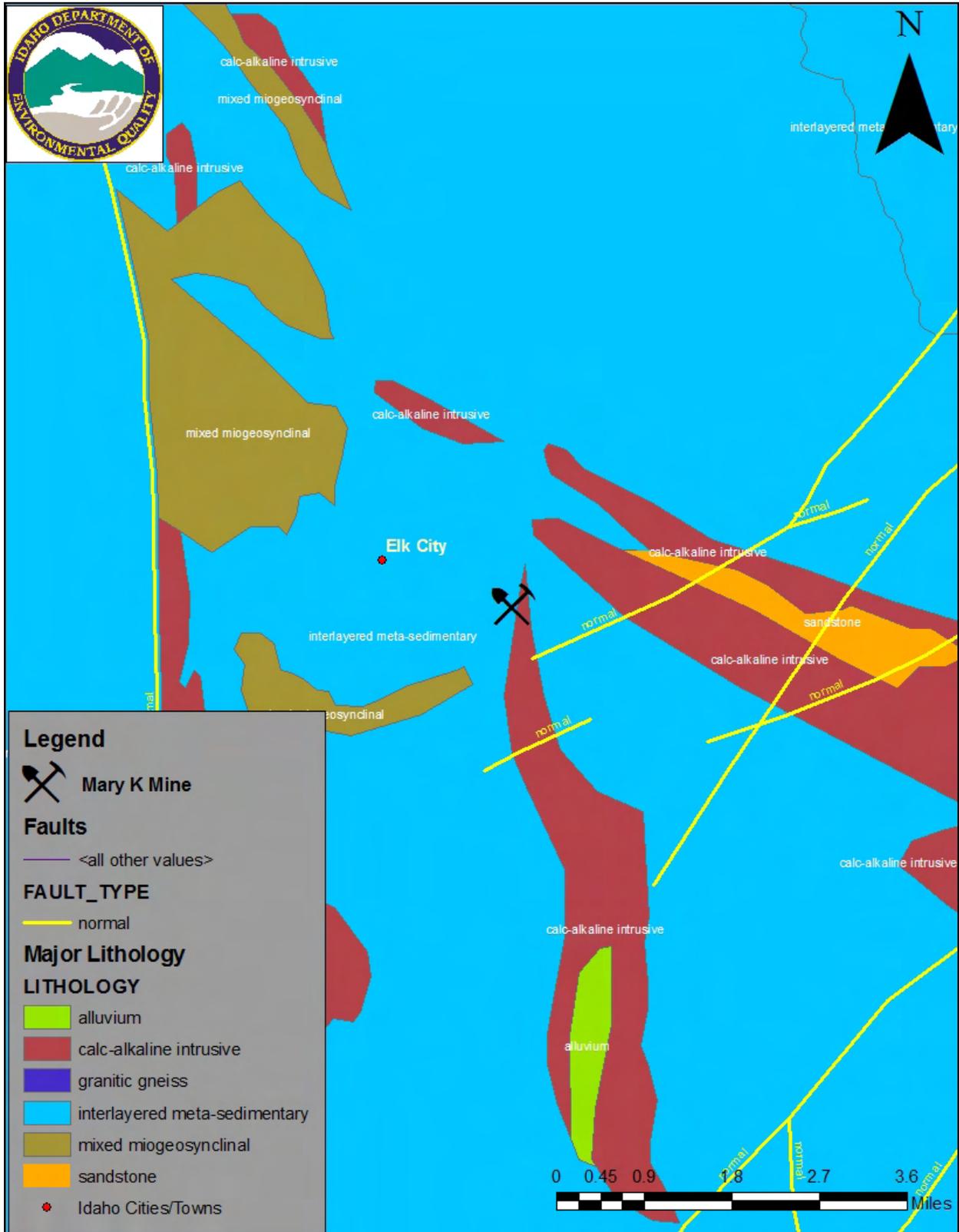


Figure 3. Map of Major Lithology in the Vicinity of the Mary K Mine and Claims
 (Map Source: ArcSDE.deqgis83.DBO.major lithology)

This page intentionally left blank for double-sided printing.

Section 7. Current and Potential Future Land Uses

More than 100 years ago the beneficial use of lands and waters in the Elk City Mining District was mining, subsistence hunting and fishing and associated commerce to support the mining operation industry. These uses expanded to include a broader market for timber, fur trapping, recreational hunting and fishing, camping, and ATV touring. Very little evidence of livestock, specifically the cattle industry, was found at the Mary K Mine and claims site. The possibility remains patented mining ground could be subdivided and sold as recreational properties. At the time of this writing no cabins, homes or structures had been constructed on the claims. A few roads, probably for timber harvest, exist on the claims and ATV trails are apparent.

This page intentionally left blank for double-sided printing.

Section 8. Mine Site Conditions

8.1 Unnamed Hydraulically Mine Area

A hydraulic pit with a high wall remains with evidence of significant disturbance of 10 acres or greater. This is an elevated placer, a hydraulic operation or a combination of both mining methods. There are several collapsed adits and there is also a collapsed shaft near one of the adits. Three collapsed adits were noted on the northern side of the workings above Glass Creek. A water conveyance ditch, which may have facilitated placer mining, lies on the north side of the mined area. The ditch appears to originate from Glass Creek.

As the collapsed adits show no evidence of any waste piles or dumps, it is presumed they were washed away during the hydraulic/placer operations, DEQ assumes the adits were prior to any hydraulic activity.

All of the photographs in Section 8 were taken by DEQ on September 21, 2011. Photos 1 through 3 show the hydraulically mined area which is now well vegetated with healthy, non-stressed plants. Note the tree stump and second growth trees in Photo 2 which indicates this area has been logged. In Photo 3 rocks piled along the drainage are a result of historic mining activities in this area.



Photo 1. High wall on southeast portion of hydraulically mine area.



Photo 2. North by northwest portion of high wall pit.



Photo 3. Bottom of high wall pit.

Photos 4 and 5 show the collapsed adits north of the hydraulic pit area. No waste dumps were evident and the area is well vegetated and stable. Photo 6 shows the collapsed shaft near the adits in the hydraulically mined area. The tree stump in Photo 6 again implies the area has been logged in the past.



Photo 4. Collapsed adit on the north side of the pit in the hydraulically mined area.



Photo 5. Collapsed adit north of the hydraulic pit area.



Photo 6. Collapsed shaft near the adits in the hydraulically mined area.

8.2 Mary K Mine

Adit 1 is collapsed and closed. No water was actively running from Adit 1, but a boggy area exists within the collapsed adit with standing water. The water was orange in appearance and went subsurface just beyond the adit structure into a trench. No surface water pathways existed from this boggy area. Vegetation is very lush with trees and brush growing in the Adit 1 bog. No plant stress is evident.



Photo 7. Collapsed Adit 1 of the Mary K Mine.

Photo 8 shows the boggy area from the mouth of Adit 1 of the Mary K mine through the collapsed area to the original opening. The ATV tracks in the photo were filled with orange stained water.



Photo 8. Boggy area of Mary K Mine Adit 1.



Photo 9. Orange stained water at the entrance of what remains of Mary K Mine Adit 1.

A trench runs perpendicular to Adit 1 following the contour of the hill to the north. It appears to be an old water conveyance structure which probably originates from Glass Creek. Photo 10, showing the old water conveyance ditch, was taken from around the hill from Adit 1 heading northeast.



Photo 10. Water conveyance ditch running perpendicular to Mary K Mine Adit 1.



Photo 11. Possibly an air pipe from the underground mine workings located just to the side of Adit 1.

There is a collapsed shaft 25 yards to the north of Mary K Mine Adit 1. The collapsed shaft is 10 yards uphill from the mouth of Adit 1. As shown in Photo 12, the area is well vegetated and stable.



Photo 12. Collapsed shaft north of Adit 1.

Mary K Mine Adit 2 is stacked 15 yards directly above Adit 1 and is collapsed with an unknown structure (roof) over it. Adit 2 is well vegetated with shrubs, trees, and grasses growing. The vegetation growing shows no stress and looks healthy.

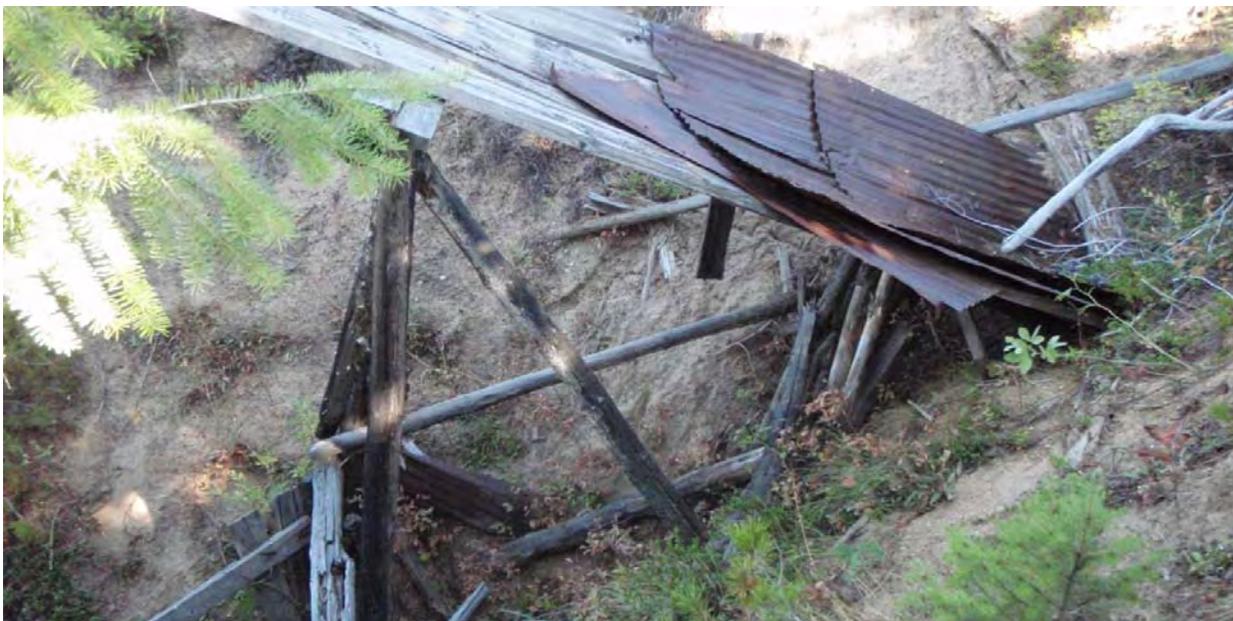


Photo 13. Mary K Mine collapsed Adit 2 (facing north) directly above Adit 1.



Photo 14. Mary K Mine collapsed Adit 2 (facing west).

The waste dump pile below Adits 1 and 2 is gray and orange in color with no sulphide smell. The waste dump consists of two parts. One part of the waste dump is approximately 1200 cubic yards of material while the adjacent waste dump is less than 500 cubic yards of material. Picture is unavailable.

This page intentionally left blank for double-sided printing.

Section 9. Sample Collection and Analysis

9.1 Collection

A total of three samples were collected from the Mary K Mine site.

- Soil (Sample MKBG1SS1) – Background soil sample (composite)
- Soil (Sample MKWD1SS1) – Waste dump soil sample (composite)
- Water (Sample MKAD1SW1) – Surface water sample from adit mouth

Waste dump soil sample MKWD1SS1 and background soil sample MKBG1SS1 were sieved at the sample location, placed in a properly marked zip lock bag. The sample was then placed in a similarly marked cloth bag and entered into the Chain-of-Custody form prior to shipping to Silver Valley Laboratories, Inc. (SVL). The portion of the sample that passed through a 9 mesh sieve was sent for laboratory analysis.

After the sample was bagged and tagged, Nitrile gloves and disposable plastic spoons were discarded into a sealable waste bag. The screens used to sieve and collect samples were washed and scrubbed with Alconox and thoroughly rinsed with distilled water and then dried with paper towels. The sieves were then stored in a clean, isolated container for transportation to the next sample location.

Prior to collection of field parameters for water quality analysis, laboratory prepared sample bottles were labeled and triple rinsed by a gloved technician who then filled the bottles as grab samples. The bottles were acidified with 10 ml nitric acid, closed, dried, and placed in a cooler with ice. Surface water sample MKAD1SW1 was collected from a boggy area at the mouth of the Adit 1 of the Mary K Mine. Insufficient water depth existed to measure conductivity and pH.

The surface water samples were submitted in accordance with EPA Chain of Custody procedures to SVL in Kellogg, Idaho for analysis of RCRA 8 Suite + copper, zinc, manganese, iron, and antimony. A copy of the laboratory report is included as Appendix A. A summary of the laboratory results is included in the tables in Sections 9.2 and 9.3. Figure 4 shows the soil and surface water sample locations.

This page intentionally left blank for double-sided printing.



Figure 4. Sample Locations and Features of the Mary K Mine

(Map Source: 2009 Natural Color 1-meter National Agriculture Imagery Program (NAIP) Idaho)

This page intentionally left blank for double-sided printing.

9.2 Soil Sample Analysis

A waste dump soil sample MKWD1SS1 and background soil sample MKBG1SS1 were analyzed at SVL utilizing EPA 6000/7000 method 6010B for all metals except mercury where method 7471A was utilized. Laboratory analytical results were compared to and discussed below relative to Idaho's *Initial Default Target Levels* (IDTLs), EPA Region 6 Human Health Screening Levels (HHSLs) and the BLM Wildlife and Livestock Risk Management Criteria for Metals in Soils (Technical Note 390 Rev. 2004).

The IDTLs are risk-based target levels for certain chemicals that have been developed by DEQ using conservative input parameters, a target acceptable risk of 10^{-5} , and a *Hazard Quotient* of 1. These numbers, although used for comparison even at remote locations, are more applicable to sites where "unrestricted uses" such as residential development are expected. Similarly, the EPA Region 6 HHSLs are human health based risk derived for screening where residents are at risk for exposure.

Table 1 summarizes laboratory analytical results for the soil samples collected.

Background soil sample MKBG1SS1 was a composite sample taken well uphill of any obvious mining activity. This sample exceeded the IDTLs for arsenic by 13.8 times, chromium by 2.1 times, manganese by 2.7 times, and mercury by 7.2 times.

Waste dump soil sample MKWD1SS1 was a composite sample taken from the two waste dumps. This sample exceeded the IDTLs for arsenic by 134.5 times, lead by 1.2 times, silver by 10 times, and mercury by 200 times. This sample exceeded the HHSLs for arsenic by 2.2 times.

Table 1 summarizes laboratory analytical results for the soil samples collected.

Table 1. Mary K Mine Background and Waste Dump Soil Sample Analysis

Metals	IDTLs (mg/kg)	HHSLs (mg/kg)	Mary K Mine Background Soil Sample MKBG1SS1 (mg/kg)	Mary K Mine Waste Dump Soil Sample AJWDSS1 (mg/kg)
Antimony	4.77	31	<2.0	3
Arsenic	0.391	23	5.4	52.6
Barium	896	1,600	194	27.4
Cadmium	1.35	39	<0.2	<0.2
Chromium	7.9	210	17.3	2.21
Copper	921	2,900	11.6	13.8
Iron		55,000	23,400	16,800
Lead	49.6		9.81	63.6
Manganese	223	3,600	620	19.6
Selenium	2.03	23	<4.0	<4.0
Silver	0.189	390	<0.5	1.9
Zinc	886	390	45.1	24.4
Mercury	0.00509	23	0.037	1.02

Orange = Exceeded Idaho Initial Default Target Levels (IDTLs).

Yellow = Exceeded Human Health Screening Levels (HHSLs).

Pink = Exceeded both IDTLs and HHSLs.

It should be noted the laboratory results indicate metals concentrations of arsenic, lead and mercury exceeded background conditions by greater than three times. If this was the only site data available and no consideration was given to proximity and use by sensitive receptors, DEQ would recommend doing additional site assessment work. However, based on the fact no humans reside on the site and there are no plans for residential development, additional site assessment may not be necessary. However, if the site has a desired future beneficial use of residential or recreation home development, human health risks are present which may require a risk management plan (RMP).

Table 2 identifies when the results of the metals analysis exceeded the BLM benchmarks. As an example, the Mary K Mine background sample MKBG1SS1 exceeded the BLM benchmark for arsenic for the robin.

Table 2. Wildlife and Livestock Risk Management Criteria for Metals in Soils (mg/kg)
 BLM Technical Note 390 Rev. 2004 “Risk Management Criteria for Metals at BLM Mining Sites”

Metals	Elk	Mule Deer	Deer Mine	Cottontail Rabbits	Canada Goose	Mallard	Robin	Cattle	Sheep	Median Values	MKWD1SS1	MKBG1SS1
Antimony											3	<2.0
Arsenic	328	200	230	438	61	116	4	419	275	275	52.6	5.4
Barium											27.4	194
Cadmium	3	3	7	6	2	1	0.3	15	12	8	<0.2	<0.2
Chromium											2.21	17.3
Copper	131	102	640	358	161	141	7	413	136	136	13.8	11.6
Iron											16,800	23,400
Lead	127	106	142	172	34	59	6	244	125	125	63.6	9.81
Manganese											19.6	620
Selenium											<4.0	<4.0
Silver											1.9	<0.5
Zinc	275	222	419	373	271	196	43	1,082	545	307	24.4	45.1
Mercury	11	11	2	15	6	4	1	45	8	8	1.02	0.037

Bold = Metals concentrations exceeded the BLM Risk Management Criteria.

9.3 Water Quality Sample Analysis

There is significant interaction between surface water and ground water systems, with the latter being more influent on the former. However, as discussed below and field parameters and laboratory analyses indicated, although metals are present locally, buffering capacity in host rock in the water column stifles migration of metals through the local surface water and ground water systems.

Mary K Mine surface water sample MKAD1SW1 was collected from the boggy area in front of Adit 1. No water was running or exiting from the collapsed adit. This water immediately went subsurface once past the adit opening area.

Surface water sample MKAD1SW1 exceeded the DEQ ground water standard, drinking water standard, and chronic cold water biota standard for arsenic by 6.9 times, 34.6 times, and 1.8 times, respectively. The sample exceeded the DEQ acute cold water biota standard for copper by 2.1 times and the DEQ chronic cold water biota standard for copper by 2.8 times. Surface water sample MKAD1SW1 exceeded the DEQ ground water standard for iron by 238 times and manganese by 24 times.

The values shown in Table 3 are unremarkable. The water in front of the adit immediately went subsurface. Thus, it is unlikely any human health risks or ecological health risks are associated with this area.

**Table 3. Total Recoverable Metals Analysis in Surface Water – Mary K Mine Site
(Concentrations expressed in mg/l unless otherwise stated.)**

Description	DEQ Ground Water Standard (T)	DEQ Drinking Water Standard MCL	DEQ Cold Water Biota Standard Acute	DEQ Cold Water Biota Standard Chronic	Surface Water Sample MKAD1SW1
Antimony					<0.020
Arsenic	0.05	0.01	0.36	0.19	0.346
Barium	2	2			0.019
Cadmium	0.005	0.005	0.00082 (H)	0.00037 (H)	<0.0020
Chromium (Total)	0.1	0.1			<0.0060
Copper	1.3		0.0046 (H)	0.0035 (H)	0.01
Iron	0.3*				71.4
Lead	0.015	0.15	0.014 (H)	0.00054 (H)	<0.0075
Manganese	0.05				1.22
Selenium	0.05	0.05	0.018 (T)	0.005 (T)	<0.040
Silver	0.1*		0.0032 (H)		<0.0050
Zinc	5*		0.035 (H)	0.032 (H)	<.0101
Mercury	0.002				

*Secondary MCL (T) – Standard in Total (H) – Hardness dependent *23mg/l

Arsenic exceeded DEQ Ground and Drinking Water Standards and the Chronic Cold Water Biota Standard.

Copper exceeded DEQ Cold Water Biota Standards for both Acute and Chronic.

Iron and Manganese exceeded DEQ Ground Water Standards.

Section 10. Pathways and Environmental Hazards

10.1 Ground Water Pathways

In areas where historic mines are located in proximity to residential areas, contamination of drinking water systems may come from two types of mine sources (ore bodies and waste dumps) and along three pathways illustrated by the following three scenarios. First, heavy metals leach from tailings piles and waste rock dumps, enter ephemeral or perennial drains, and then contaminate the area's shallow ground water system. Second, heavy metals leach from the local ore bodies and are transported through the geologic structure to the shallow ground water. Third, heavy metals could leach out of the ore bodies, and be discharged from the underground workings as adit water, that is then conveyed through ephemeral and perennial drains to the shallow ground water systems.

10.2 Surface Water Pathways

The surface water migration pathway target distance limit (TDL) begins at the probable point of entry (PPE) of surface water runoff from a site to a surface water body and extends downstream for 15 miles. A map showing the source water delineation including the 15-mile surface water TDL for the Mary K Mine is shown in Figure 5.

If the water that runs from the adit makes a connection, the PPE would be Glass Creek. At the time of the site visit Glass Creek was dry. The water from the adit went subsurface after approximately 30 feet. Glass Creek is a tributary to the American River. The American River flows into the South Fork of the Clearwater. The 15-mile TDL is located approximately less than one quarter of a mile east of Newsome Creek on the South Fork of the Clearwater River.

10.3 Domestic Wells and Public Water Supplies

No wells exist on the Bennett Lumber Products property. There are 62 domestic wells and three public water system wells located within the 4-mile radius of the Mary K Mine (Figure 5). Approximately 12 of the domestic wells are located within the structural geology. Elk City Water & Sewer Association public water system (PWS) ID2250017 is separated by structural geology.

This page intentionally left blank for double-sided printing.

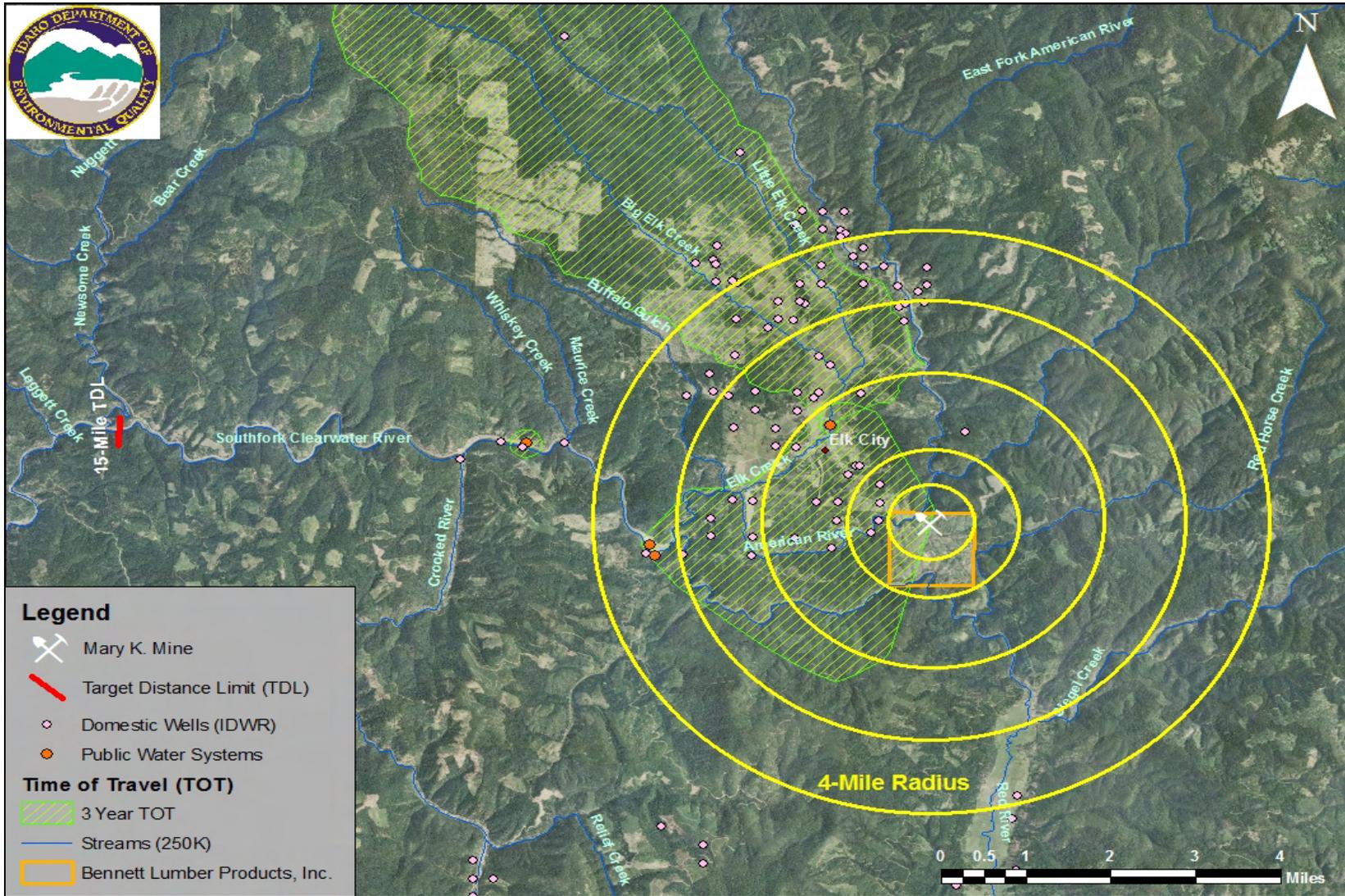


Figure 5. Map of the Source Water Delineation Including the 15-Mile Surface Water TDL for the Mary K Mine (Map Source: 2009 Natural Color 1-meter NAIP Idaho)

This page intentionally left blank for double-sided printing.

The following four paragraphs were taken from DEQ's 2003 Source Water Assessment to provide historical information relative to the Bennett Lumber Products (aka Bennett Forest Industries) facility near Elk City. The facility no longer exists, the mill closed, and all structures, equipment, etc. were removed approximately five years ago.

Two other public water systems within the four-mile radius belong to Bennett Forest Industries (Well #2 – ID2250056 and Well #3 – ID2250056). The Bennett Forest Industries is a non-community, non-transient drinking water system consisting of one active ground water well (Well #2) and an inactive backup well (Well #3). No locational data is provided for the backup well. The systems previously served 50 people through three connections. The active well is located approximately two miles southwest of Elk City, between the South Fork of the Clearwater River and Hwy 14.

The inorganic chemicals antimony and fluoride have been detected at Well #2 at levels at or slightly greater than their Maximum Contaminant Level (MCL). In November 1997, antimony was detected at 6 mg/L, a level equal to the MCL. Fluoride was detected in November 1997 at 4.4 mg/L and again in June 2001 at 4.1 mg/L, levels slightly above the MCL of 4 mg/L. Arsenic was detected at high levels in Well #2. In November 1997 arsenic was detected at 28 mg/L and again in June 2001 at 27 mg/L, levels greater than the recently revised MCL of 10 mg/L. In October 2001, the EPA lowered the arsenic MCL from 50 mg/L to 10 mg/L, giving PWSs until 2006 to meet the new requirement. No volatile organic chemicals or synthetic organic chemicals have ever been detected in the system. Trace concentrations of inorganic chemicals barium, chromium, nitrate, selenium, and sulfate have been detected in tested water, but at concentrations significantly below the MCLs as set by the EPA.

The Mary K Mine is located in the source water delineation zone with a time of travel of three years. The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the zone of contribution into time of travel (TOT) zones (zones indicating the number of years necessary for a particle of water to reach a well) for water in the aquifer. DEQ contracted with the University of Idaho to perform the delineations using a refined computer model approved by the EPA in determining the 3-year (Zone 1B), 6-year (Zone 2), and 10-year (Zone 3) TOT for water in the vicinity of the Bennett Forest Industries well. The computer model used site specific data, assimilated by the University of Idaho from a variety of sources including operator input, local area well logs, and hydrogeologic reports.

The conceptual hydrogeologic model for the Bennett Forest Industries source well near Elk City, Idaho is based on interpretation of available well logs. The source well log indicates water is derived from fractured crystalline rock. Based on the geologic map of the Elk City quadrangle at a scale of 1:250,000 (Mitchell and Bennett, 1979), the well is in metamorphosed intrusive rock. Rock described as "granite" on the source well log is probably gneiss, based upon the geologic map and experience. Reference to all non-basalt rock in the area as "granite" is a frequently-made error among drillers and road-builders in this region.

The Junction Lodge PWS (ID2250030) is located within the 15-mile TDL outside of the 4-mile radius. Although all structures and buildings still remain, the Junction Lodge has not been open

or in operation since 2001. The Junction Lodge drinking water system consists of a single well with six-inch casing drilled to a depth of 127 feet through granite. The water is pumped to two 1,000-gallon storage tanks and is used to supply a motel and RV park. The system rated high susceptibility to inorganic contaminants, volatile organic contaminants, synthetic organic contaminants, and microbial contaminants. The high ratings can be attributed, in large part, to the number and nature of potential contaminant sources within the circle of a 1000-foot radius about the well.

10.4 Air Quality Pathways

The air quality pathways are not complete. There are no residences on the claims.

10.5 Soil Exposures

The soil exposure pathways are not complete. There are no permanent residents or site workers on the Mary K Mine and claims site. All historic mine and mill site related disturbances are well vegetated and stable. Although access to the mine is not difficult, it appears activities at the site are occasional hunters and incidental visits by others. Thus, soil pathways are sporadic at best and incomplete for these users.

10.6 Residences, Schools, and Day Care Facilities

The nearest potential permanent residents are approximately one mile down gradient and downstream of Glass Creek and are located along the American River. There is one elementary school and one preschool in Elk City. There are no day cares in Elk City.

10.7 Wetlands

No significant wetlands were located in the area. The area has been logged, possibly several times. Nevertheless, the vegetation is well re-established as depicted in the photographs in Section 8.

10.8 Sensitive, Rare, and Threatened Species (Plant and Animal)

Most of the sensitive species have huge ranges which overlap onto the Mary K Mine. Due to the size of those ranges, these species may not receive significant exposure time or doses to heavy metals. It is possible one or all of these plant species could grow on soils with elevated metals.

Six rare or sensitive plant species are documented to exist within the 4-mile radius of the Mary K Mine (Figure 6). The following plants are listed as no status.

Rare or sensitive plants include:

Candystick (*Allotropa virgate*)
Case's Corydalis (*Corydalis caseana ssp. hastata*)
Idaho Strawberry (*Waldsteinia idahoensis*)
Payson's Milkvetch (*Astragalus paysonii*)
Plumed Clover (*Trifolium plumosum ssp. Amplifolium*)
Bank Monkeyflower (*Mimulus clivicola*)

Below is a list of non-game and game animals listed within the 4-mile radius of the Mary K Mine. The non-game animals, with the exception of the lynx, are listed as "species of concern" and have no status. The game animals are regulated by the Idaho Department of Fish and Game (IDFG). However, due to the lack of tailings impoundments, well vegetated dumps, and unremarkable water chemistry results, it is unlikely there is a significant source for exposure (Figure 6).

Listed Threatened Animal Species of Concern:

Lynx (*Lynx canadensis*)

No Status Animal Species of Concern:

Fisher (*Martes pennant*)
Great Gray Owl (*Strix nebulosa*)
Idaho Giant Salamander (*Dicomptodon aterrimus*)
Inland Tailed Frog (*Ascaphus montanus*)
Columbia Spotted Frog (*Rana luteiventris*)
Northern Goshawk (*Accipiter gentilis*)
Barred Owl (*Strix varia*)
Northern Leopard Frog (*Rana pipiens*)
A Mayfly (*Caudatella edmundsi*)
Black-Backed Woodpecker (*Picoides arcticus*)
Pileated Woodpecker (*Dryocopus pileatus*)
American Beaver (*Castor Canadensis*)
Spruce Grouse (*Falcapennis Canadensis*)
Yellow-bellied Marmot (*Marmota flaviventris*)

Recently Delisted in Idaho Animal Species of Concern:

Gray Wolf (*Canis lupus*)
Potential Wolf Range (Nez Perce)

This page intentionally left blank for double-sided printing.

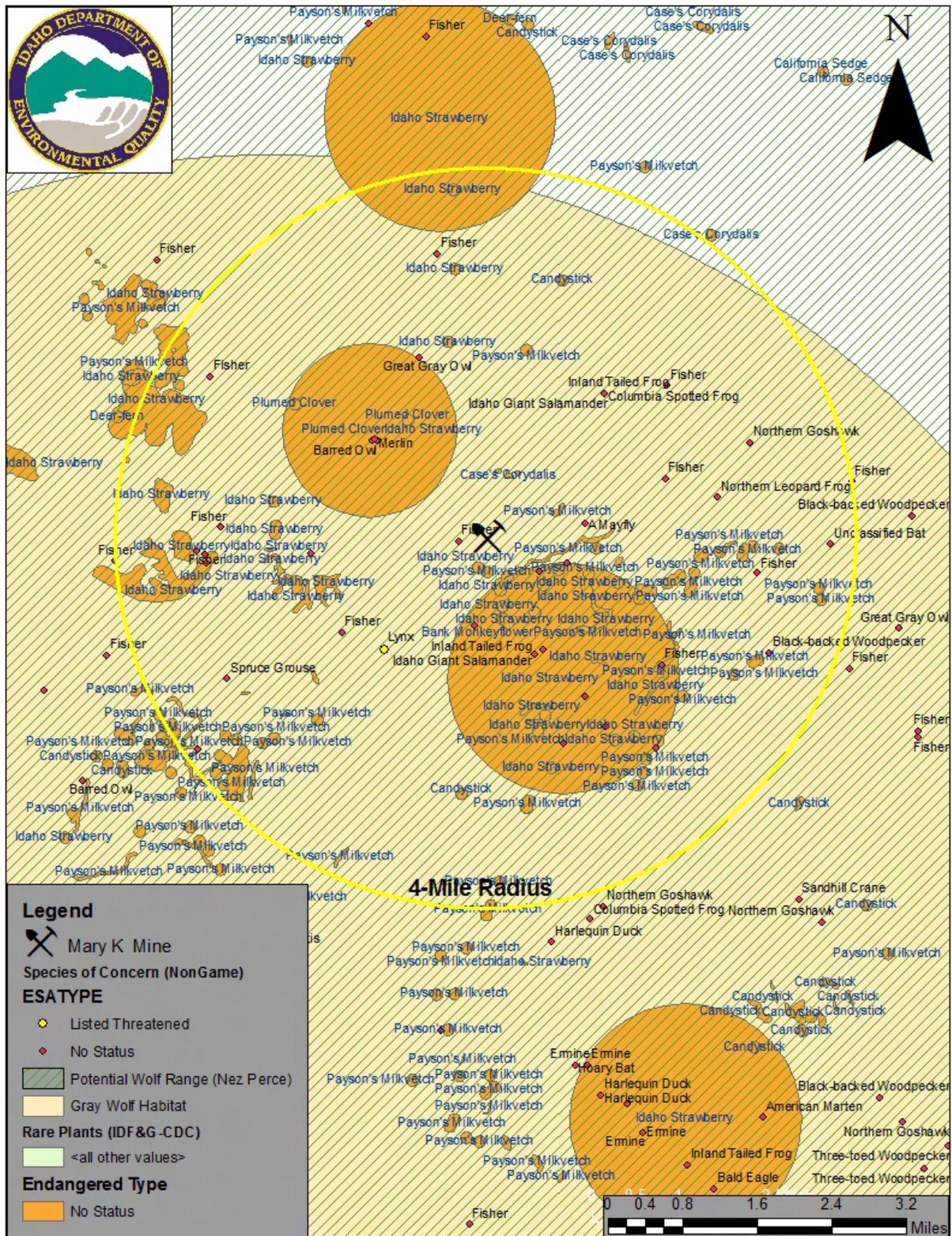


Figure 6. Sensitive Species In and Around the Mary K Mine and Claims; Species of Concern Listed are Plants and Animals
 (Map Sources: SDE Feature Dataset, Animal Conservation Database; Idaho DEQ GIS ArcSDE 9.2 Geodatabase)

This page intentionally left blank for double-sided printing.

10.9 Fisheries

The following fish species have been observed by IDFG within the four mile radius of the Mary K Mine (Figure 7). The Chinook salmon are in an Ecologically Significant Unit (ESU) (fall and spring-summer runs). In general the area is classified as “critical habitat” for all of the species, with the exception of the brook trout. In addition this area is classified as “known occupied for the bull trout.”

Westslope Cutthroat Trout (*Oncorhynchus clarki lewisi*)
Chinook Salmon (*Oncorhynchus tshawytscha*) (Fall/Spring/Summer runs)
Mountain Whitefish (*Prosopium williamsoni*)
Bull Trout (*Salvelinus confluentus*)
Steelhead (*Oncorhynchus mykiss*)
Redband Trout (*Oncorhynchus mykiss*)
Brook Trout (*Salvelinus fontinalis*)

Results of the water chemistry analysis for the mine indicated arsenic exceeded the Chronic Cold Water Biota Standard by 1.8 times and copper exceeded both the Acute (by 2.1 times) and Chronic (by 2.8 times) Cold Water Biota Standards. These values are not remarkable. The water collected around the mouth of Adit 1 goes subsurface within 30 feet of the adit and has no pathway to any surface waters.

10.10 Sensitive Waterways

Glass Creek is a tributary to American River; both water bodies are contained in waterbody ID17060305CL052_04, and are listed on the State of Idaho 303(d) list for impaired waters. They are listed as not supporting cold water aquatic life and salmonid spawning due to temperature. The Clean Water Act (CWA) requires the state to prepare a report, listing (a) the current conditions of all state waters and (b) those waters that are impaired and needing a TMDL (total maximum daily load). The first list is called the 305(b) list and the second is called the 303(d) list. Both lists are named in accordance with the sections of the CWA where they are defined; together they are known as the Integrated Report. Although they are maintained as separate lists and presented separately in the Integrated Report, impaired waters are just some of the state’s waters, so water on the 303(d) list is actually a subset of those on the 305(b) list. Figure 8 illustrates the 303(d) listed streams in the area.

10.11 Livestock Receptors

There is no grazing allotment in the area. No evidence of livestock being pastured on a long term basis was noted at the unnamed hydraulically mined area or the Mary K Mine area. Therefore, pathways or exposures for livestock are minimal including those pathways to horses used by packers for hunting and recreation.

This page intentionally left blank for double-sided printing.

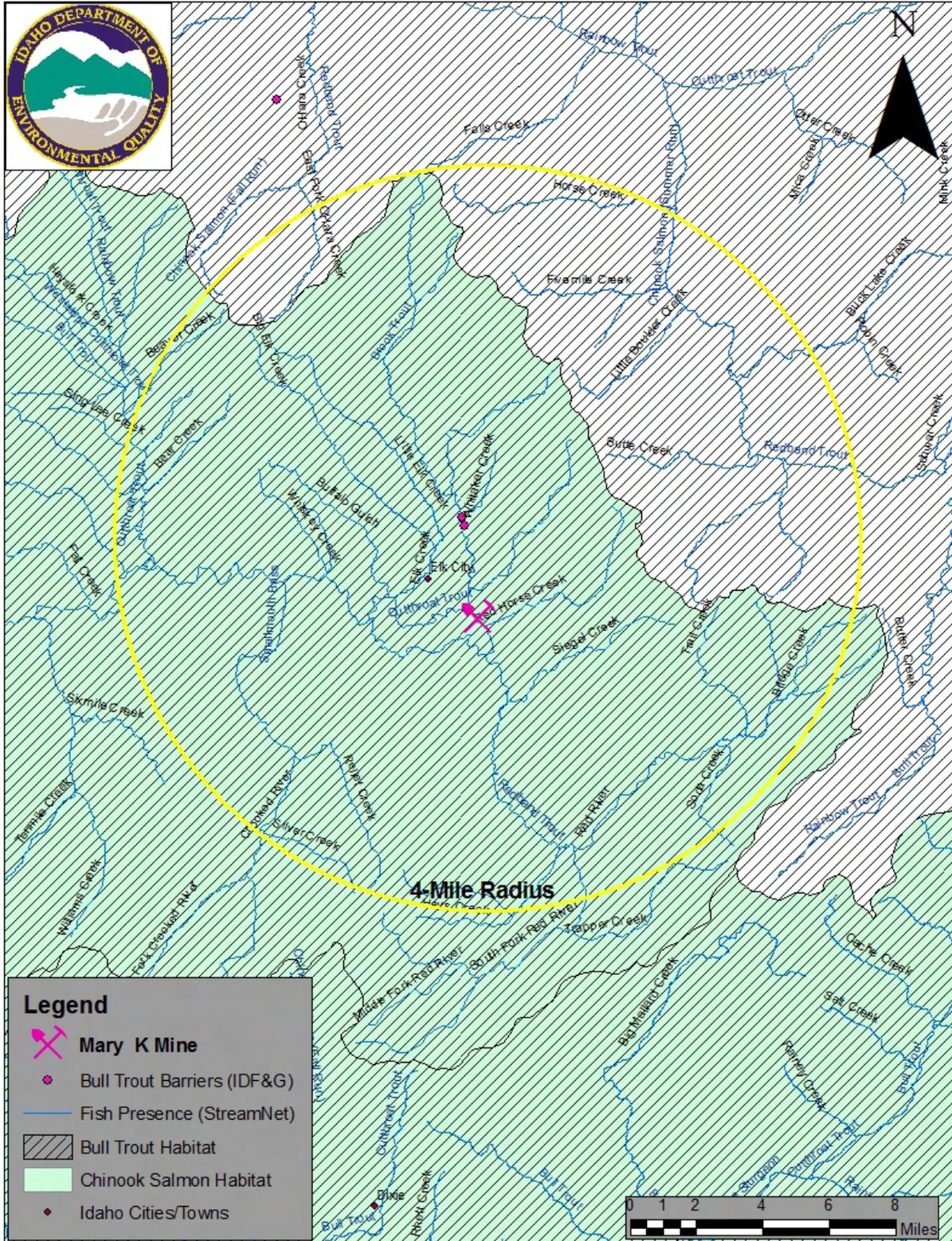


Figure 7. Fisheries Within 4-Mile Radius and in the Vicinity of the Mary K Mine and Claims

(Map source: Idaho DEQ GIS ArcSDE 9.3.1 Geodatabase)

This page intentionally left blank for double-sided printing.



Figure 8. State of Idaho 303(d) Map for Impaired Waters Not Supporting Cold Water Aquatic Life and Salmonid Spawning Due to Temperature
 (Map Source: DEQ.GIS.ArcSDE 9.3 Geodatabase, NAIP 2004)

This page intentionally left blank for double-sided printing.

Section 11. Summary and Conclusions

Generally speaking, toxicological risks to human and ecological receptors are unlikely at the Mary K Mine and claims. This is due to the lack of residences or structures and limited use of this area by the public. The area is well vegetated and stable. Airborne, water, and soil pathways presently do not exist.

The laboratory results from the soils analysis indicate that metals concentrations of arsenic, lead and mercury exceed background conditions by greater than three times. If this was the only site data available and no consideration was given to proximity and use by sensitive receptors, DEQ would recommend doing additional site assessment work. However, based on the fact that there are no human residents on the site and no plans for residential development, additional site assessment may not be necessary. However, if the site has a desired future beneficial use of residential or recreation home development, human health risks are present which may require some level of risk management planning.

The BLM soil risk bench marks for the robin were exceeded by arsenic, copper, and mercury. The risk bench marks for the Canada goose, mallard and robin were exceeded by lead. These exceedences occurred in both the background and waste dump soil samples. Although health risks due to significant exposure to these animals is unlikely, these analyses indicate this is a highly mineralized area.

No drinking water sources, wells or ground water sources exist on the Mary K Mine area. The surface water sample was collected from a boggy area in front of Adit 1. No water was running or exiting from the collapsed adit. The water in front of the adit immediately goes subsurface, so it is unlikely any human health risks or ecological health risks are associated with this area. The sample values were unremarkable.

Based on existing conditions and uses, historic information, data observations made during the site visit, analysis of the mine wastes, potential pathway of contaminants to receptors and potential exposures to ecological and human receptors, DEQ determines the Mary K Mine and associated claims as No Remedial Action is Planned (NRAP).

Although there are no permanent residents or site workers on or immediately adjacent to the site, some level of risk management planning could reduce or abate risks from these receptors should future developments be proposed.

This page intentionally left blank for double-sided printing.

Section 12. References

- BLM (U.S. Bureau of Land Management) 2011. *Land Patent Details* – BLM GLO Records. http://www.glorerecords.blm.gov/results/default.aspx?searchCriteria=type=survey|st=ID|cty=049|twp_nr=29|twp_dir=N|rng_nr=08|rng_dir=E#resultsTabIndex=0
- DEQ (Idaho Department of Environmental Quality) 2002. South Fork Clearwater River Subbasin Assessment and TMDL.
- DEQ (Idaho Department of Environmental Quality) 2011. Safe Drinking Water Information System (SDWIS).
- DEQ (Idaho Department of Environmental Quality) 2012. 2012 305(b) list. Available URL: <http://www.deq.idaho.gov/water-quality/surface-water/monitoring-assessment/integrated-report.aspx#2012-IR>
- DEQ (Idaho Department of Environmental Quality) 2003. Source Water Assessment.
- Gaston, M.P. and E.H. Bennett. 1979. Geologic Map of the Elk City Quadrangle, Idaho, Scale 1:250,000. Idaho Bureau of Mines and Geology.
- IDFG (Idaho Department of Fish and Game) 2002. Available URL: http://www2.state.id.us/fishgame/info/cdc/plants/vasc_plants&status_n-r.htm
- IDFG (Idaho Department of Fish and Game) 2002. Fisheries information GIS layer.
- IDWR (Idaho Department of Water Resources) 1997. COVERAGE IDOWN -- Idaho Surface Ownership.
- IDWR2, 2010. GIS shape file of well database.
- Mitchell, V.E., E.H. Bennett. 1979. Geologic map of the Baker quadrangle, Idaho. Idaho Bureau of Mines and Geology, Geologic map series Baker 2 Quadrangle, scale 1:250,000.
- Shenon, P.J. and J.C. Reed. 1934. Geology and Ore Deposits of the Elk City, Orogrande, Buffalo Hump, and Tenmile Districts, Idaho County, Idaho: U.S. Geological Survey Circular 9.
- Thomson, Frances A. and Samuel M. Ballard. 1924. Geology and Gold Resources of North Central Idaho. Idaho Bureau of Mines and Geology Bulletin No. 7.

This page intentionally left blank for double-sided printing.

Appendix A. Laboratory Sample Reports



CHAIN OF CUSTODY RECORD

SVL Analytical, Inc. • One Government Gulch • Kellogg, ID 83837 • (208) 784-1258 • FAX: (208) 783-0891

Page 1 of 1

W150149
FOR SVL USE ONLY
SVL JOB #

Report to Company: IDEQ
 Contact: Tina Elayer
 Address: 1410 N. HILTON
BOISE, ID. 83704
 Phone Number: 208-313-0563
 FAX Number: 208-313-0154
 E-mail: tina.elayer@ideg.idaho.gov

Invoice Sent To: Tina Elayer
 Contact: Tina Elayer
 Address: _____
 Phone Number: _____
 FAX Number: _____
 PO#: _____

TEMP on Receipt: N/A

Table 1. -- Matrix Type
 1 = Surface Water, 2 = Ground Water
 3 = Soil/Sediment, 4 = Rinsate, 5 = Oil
 6 = Waste, 7 = Other

Project Name: Fluence PAS
 Sampler's Signature: Julia E. [Signature]

USACE? Yes No

Indicate State of sample origination: JD

Sample ID	Collection Date	Time	Collected by: (Init.)	Misc. Matrix Type (From Table 1)	No. of Containers	Preservative(s)					Other (Specify)	Analyses Required	Rush Instructions (Days)	Comments		
						Unpreserved	HNO ₃ Filtered	HNO ₃ Unfiltered	HCl	H ₂ SO ₄					NaOH	
1 LPAD2SW2	9/21/11	10:45 TE	TE	1	1										* Total in water * Soil Fed Stored to -9 mesh.	
2 LPAD1SW1	9/21/11	10:45 TE	TE	1	1											
3 MLAD1SW1	9/21/11	12:35 TE	TE	1	1											
4 MLAD1SW1	9/21/11	11:20 TE	TE	1	1											
5 MLAD1SD1	9/21/11	13:00 TE	TE	3	1											
6 MKLAD1SS1	9/21/11	11:45 TE	TE	3	1											
7 MKLAD1SS1	9/21/11	11:45 TE	TE	3	1											
8 WAAD1SW1	9/21/11	13:11 TE	TE	1	1											
9																
10																

Relinquished by: Julia E. [Signature]
 Relinquished by: _____
 Date: 10/6/11
 Date: _____
 Time: 15:50
 Time: _____

SAMPLE RECEIPT/CHAIN-OF -CUSTODY CHECKLIST

The following items were checked for completeness, correctness, and compliance to project specifications using the Chain-of-Custody (COC) and other supporting information.

Date of acceptance: 10/6/11
 SVL Work No: W1J0149

By: CR Sewy

Item	Description	V	VC	NV	NA	Comments
1	Client or project name	✓				IDEQ-BOISE
2	Date and time of receipt at lab	✓				10/6/11 12:50
3	Received by	✓				<i>[Signature]</i>
4	Temperature blank or cooler temperature				✓	Temp. N/A°C.
5	Were the sample(s) received on ice				✓	
6	Custody tape/bottle seals				✓	
7	Condition of samples upon receipt (leaking; bubbles in VOA vials)	✓				Good
8	Sample numbers/IDs agree with COC	✓				
9	Sample date & time agree with COC	✓				
10	Number of containers for each sample	✓				
11	The correct preservative for the analysis requested	✓			CR	
12	Did an SVL employee preserve sample(s) upon receipt				✓	NO
12	Type of container for each sample / volume received	✓				
13	Analysis requested for each sample	✓				
14	Sample matrix description	✓				
15	COC properly completed & legible	✓				
16	Corrections properly made (initials & date)				✓	
17	Additional comments or records of sample condition or treatment (unlisted or missing samples at laboratory, aliquot taken, sample hold, samples subcontracted, communications between client and laboratory)				✓	
18	Shipper's air bill	✓				

V- Verified VC- Verified Corrections Made NV- Not Verified NA- Not Applicable

Additional Comments: _____



IDEQ (Boise)
1410 N. Hilton
Boise, ID 83706

Project Name: Boise
Work Order: **W1J0149**
Reported: 19-Oct-11 15:13

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Sampled By	Date Received
LPAD2SW2	W1J0149-01	Surface Water	22-Sep-11 10:45	TE	06-Oct-2011
LPAD1SW1	W1J0149-02	Surface Water	22-Sep-11 10:34	TE	06-Oct-2011
MLAD1SW1	W1J0149-03	Surface Water	21-Sep-11 12:53	TE	06-Oct-2011
MKAD1SW1	W1J0149-04	Surface Water	21-Sep-11 11:26	TE	06-Oct-2011
MLAD1SD1	W1J0149-05	Soil	21-Sep-11 13:00	TE	06-Oct-2011
MKWD1SS1	W1J0149-06	Soil	21-Sep-11 11:45	TE	06-Oct-2011
MKBG1SS1	W1J0149-07	Soil	21-Sep-11 11:40	TE	06-Oct-2011
WAAD1SW1	W1J0149-08	Surface Water	22-Sep-11 13:11	TE	06-Oct-2011

Solid samples are analyzed on an as-received, wet-weight basis, unless otherwise requested.

Sample preparation is defined by the client as per their Data Quality Objectives.

This report supercedes any previous reports for this Work Order. The complete report includes pages for each sample, a full QC report, and a notes section.

The results presented in this report relate only to the samples, and meet all requirements of the NELAC Standards unless otherwise noted.



IDEQ (Boise)
1410 N. Hilton
Boise, ID 83706

Project Name: Boise
Work Order: **W1J0149**
Reported: 19-Oct-11 15:13

Client Sample ID: **LPAD2SW2**

SVL Sample ID: **W1J0149-01 (Surface Water)**

Sample Report Page 1 of 1

Sampled: 22-Sep-11 10:45
Received: 06-Oct-11
Sampled By: TE

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total)										
EPA 7470A	Mercury	< 0.00020	mg/L	0.00020	0.000072		W142267	JAA	10/17/11 13:13	
Metals (Total Recoverable)										
EPA 6010B	Antimony	< 0.020	mg/L	0.020	0.005		W142013	TJK	10/19/11 12:12	
EPA 6010B	Arsenic	< 0.025	mg/L	0.025	0.007		W142013	TJK	10/19/11 12:12	
EPA 6010B	Barium	0.0215	mg/L	0.0020	0.0004		W142013	TJK	10/19/11 12:12	
EPA 6010B	Cadmium	< 0.0020	mg/L	0.0020	0.0005		W142013	TJK	10/19/11 12:12	
EPA 6010B	Chromium	< 0.0060	mg/L	0.0060	0.0006		W142013	TJK	10/19/11 12:12	
EPA 6010B	Copper	< 0.010	mg/L	0.010	0.003		W142013	TJK	10/19/11 12:12	
EPA 6010B	Iron	< 0.060	mg/L	0.060	0.017		W142013	TJK	10/19/11 12:11	
EPA 6010B	Lead	< 0.0075	mg/L	0.0075	0.0034		W142013	TJK	10/19/11 12:12	
EPA 6010B	Manganese	< 0.0040	mg/L	0.0040	0.0011		W142013	TJK	10/19/11 12:11	
EPA 6010B	Selenium	< 0.040	mg/L	0.040	0.009		W142013	TJK	10/19/11 12:12	
EPA 6010B	Silver	< 0.0050	mg/L	0.0050	0.0005		W142013	TJK	10/19/11 12:12	
EPA 6010B	Zinc	< 0.0100	mg/L	0.0100	0.0021		W142013	TJK	10/19/11 12:12	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



IDEQ (Boise)
1410 N. Hilton
Boise, ID 83706

Project Name: Boise
Work Order: **W1J0149**
Reported: 19-Oct-11 15:13

Client Sample ID: **LPAD1SW1**

SVL Sample ID: **W1J0149-02 (Surface Water)**

Sample Report Page 1 of 1

Sampled: 22-Sep-11 10:34
Received: 06-Oct-11
Sampled By: TE

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total)										
EPA 7470A	Mercury	< 0.00020	mg/L	0.00020	0.000072		W142267	JAA	10/17/11 13:18	
Metals (Total Recoverable)										
EPA 6010B	Antimony	< 0.020	mg/L	0.020	0.005		W142013	TJK	10/19/11 12:18	
EPA 6010B	Arsenic	< 0.025	mg/L	0.025	0.007		W142013	TJK	10/19/11 12:18	
EPA 6010B	Barium	0.0274	mg/L	0.0020	0.0004		W142013	TJK	10/19/11 12:18	
EPA 6010B	Cadmium	< 0.0020	mg/L	0.0020	0.0005		W142013	TJK	10/19/11 12:18	
EPA 6010B	Chromium	< 0.0060	mg/L	0.0060	0.0006		W142013	TJK	10/19/11 12:18	
EPA 6010B	Copper	< 0.010	mg/L	0.010	0.003		W142013	TJK	10/19/11 12:17	
EPA 6010B	Iron	< 0.060	mg/L	0.060	0.017		W142013	TJK	10/19/11 12:16	
EPA 6010B	Lead	< 0.0075	mg/L	0.0075	0.0034		W142013	TJK	10/19/11 12:18	
EPA 6010B	Manganese	< 0.0040	mg/L	0.0040	0.0011		W142013	TJK	10/19/11 12:16	
EPA 6010B	Selenium	< 0.040	mg/L	0.040	0.009		W142013	TJK	10/19/11 12:18	
EPA 6010B	Silver	< 0.0050	mg/L	0.0050	0.0005		W142013	TJK	10/19/11 12:17	
EPA 6010B	Zinc	0.0818	mg/L	0.0100	0.0021		W142013	TJK	10/19/11 12:18	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



IDEQ (Boise)
1410 N. Hilton
Boise, ID 83706

Project Name: Boise
Work Order: **W1J0149**
Reported: 19-Oct-11 15:13

Client Sample ID: **MLAD1SW1**

SVL Sample ID: **W1J0149-03 (Surface Water)**

Sample Report Page 1 of 1

Sampled: 21-Sep-11 12:53
Received: 06-Oct-11
Sampled By: TE

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total)										
EPA 7470A	Mercury	< 0.00020	mg/L	0.00020	0.000072		W142267	JAA	10/17/11 13:20	
Metals (Total Recoverable)										
EPA 6010B	Antimony	< 0.020	mg/L	0.020	0.005		W142013	TJK	10/19/11 12:23	
EPA 6010B	Arsenic	< 0.025	mg/L	0.025	0.007		W142013	TJK	10/19/11 12:23	
EPA 6010B	Barium	0.0041	mg/L	0.0020	0.0004		W142013	TJK	10/19/11 12:23	
EPA 6010B	Cadmium	< 0.0020	mg/L	0.0020	0.0005		W142013	TJK	10/19/11 12:23	
EPA 6010B	Chromium	< 0.0060	mg/L	0.0060	0.0006		W142013	TJK	10/19/11 12:23	
EPA 6010B	Copper	< 0.010	mg/L	0.010	0.003		W142013	TJK	10/19/11 12:23	
EPA 6010B	Iron	1.94	mg/L	0.060	0.017		W142013	TJK	10/19/11 12:22	
EPA 6010B	Lead	< 0.0075	mg/L	0.0075	0.0034		W142013	TJK	10/19/11 12:23	
EPA 6010B	Manganese	0.275	mg/L	0.0040	0.0011		W142013	TJK	10/19/11 12:22	
EPA 6010B	Selenium	< 0.040	mg/L	0.040	0.009		W142013	TJK	10/19/11 12:23	
EPA 6010B	Silver	< 0.0050	mg/L	0.0050	0.0005		W142013	TJK	10/19/11 12:23	
EPA 6010B	Zinc	< 0.0100	mg/L	0.0100	0.0021		W142013	TJK	10/19/11 12:23	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



IDEQ (Boise)
1410 N. Hilton
Boise, ID 83706

Project Name: Boise
Work Order: **W1J0149**
Reported: 19-Oct-11 15:13

Client Sample ID: **MKAD1SW1**

SVL Sample ID: **W1J0149-04 (Surface Water)**

Sample Report Page 1 of 1

Sampled: 21-Sep-11 11:26
Received: 06-Oct-11
Sampled By: TE

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total)										
EPA 7470A	Mercury	< 0.00020	mg/L	0.00020	0.000072		W142267	JAA	10/17/11 13:21	
Metals (Total Recoverable)										
EPA 6010B	Antimony	< 0.020	mg/L	0.020	0.005		W142013	TJK	10/19/11 12:28	
EPA 6010B	Arsenic	0.346	mg/L	0.025	0.007		W142013	TJK	10/19/11 12:28	
EPA 6010B	Barium	0.0190	mg/L	0.0020	0.0004		W142013	TJK	10/19/11 12:28	
EPA 6010B	Cadmium	< 0.0020	mg/L	0.0020	0.0005		W142013	TJK	10/19/11 12:28	
EPA 6010B	Chromium	< 0.0060	mg/L	0.0060	0.0006		W142013	TJK	10/19/11 12:28	
EPA 6010B	Copper	0.010	mg/L	0.010	0.003		W142013	TJK	10/19/11 12:28	
EPA 6010B	Iron	71.4	mg/L	0.060	0.017		W142013	TJK	10/19/11 12:27	
EPA 6010B	Lead	< 0.0075	mg/L	0.0075	0.0034		W142013	TJK	10/19/11 12:28	
EPA 6010B	Manganese	1.22	mg/L	0.0040	0.0011		W142013	TJK	10/19/11 12:27	
EPA 6010B	Selenium	< 0.040	mg/L	0.040	0.009		W142013	TJK	10/19/11 12:28	
EPA 6010B	Silver	< 0.0050	mg/L	0.0050	0.0005		W142013	TJK	10/19/11 12:28	
EPA 6010B	Zinc	0.0101	mg/L	0.0100	0.0021		W142013	TJK	10/19/11 12:28	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



One Government Gulch - PO Box 929

Kellogg ID 83837-0929

(208) 784-1258

Fax (208) 783-0891

IDEQ (Boise)
1410 N. Hilton
Boise, ID 83706

Project Name: Boise
Work Order: **W1J0149**
Reported: 19-Oct-11 15:13

Client Sample ID: **MLAD1SD1**

SVL Sample ID: **W1J0149-05 (Soil)**

Sample Report Page 1 of 1

Sampled: 21-Sep-11 13:00
Received: 06-Oct-11
Sampled By: TE

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Antimony	< 2.0	mg/kg	2.0	0.4		W141401	TJK	10/19/11 09:42	
EPA 6010B	Arsenic	20.7	mg/kg	2.5	0.4		W141401	TJK	10/19/11 09:42	
EPA 6010B	Barium	105	mg/kg	0.200	0.024		W141401	TJK	10/19/11 09:41	
EPA 6010B	Cadmium	0.30	mg/kg	0.20	0.02		W141401	TJK	10/19/11 09:41	
EPA 6010B	Chromium	28.2	mg/kg	0.60	0.05		W141401	TJK	10/19/11 09:41	
EPA 6010B	Copper	11.7	mg/kg	1.00	0.21		W141401	TJK	10/19/11 09:41	
EPA 6010B	Iron	30800	mg/kg	6.0	1.1		W141401	TJK	10/19/11 09:40	
EPA 6010B	Lead	5.69	mg/kg	0.75	0.21		W141401	TJK	10/19/11 09:42	
EPA 6010B	Manganese	1960	mg/kg	0.40	0.04		W141401	TJK	10/19/11 09:40	
EPA 6010B	Selenium	4.6	mg/kg	4.0	1.2		W141401	TJK	10/19/11 09:42	
EPA 6010B	Silver	< 0.50	mg/kg	0.50	0.04		W141401	TJK	10/19/11 09:41	
EPA 6010B	Zinc	52.1	mg/kg	1.00	0.09		W141401	TJK	10/19/11 09:41	
EPA 7471A	Mercury	0.263	mg/kg	0.033	0.007		W142105	JAA	10/11/11 13:14	

Percent Solids

Percent Solids	% Solids	95.6	%	0.1			W141402	DP	10/10/11 12:23	
----------------	----------	------	---	-----	--	--	---------	----	----------------	--

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



One Government Gulch - PO Box 929

Kellogg ID 83837-0929

(208) 784-1258

Fax (208) 783-0891

IDEQ (Boise)
1410 N. Hilton
Boise, ID 83706

Project Name: Boise
Work Order: **W1J0149**
Reported: 19-Oct-11 15:13

Client Sample ID: **MKWD1SS1**

SVL Sample ID: **W1J0149-06 (Soil)**

Sample Report Page 1 of 1

Sampled: 21-Sep-11 11:45
Received: 06-Oct-11
Sampled By: TE

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Antimony	3.0	mg/kg	2.0	0.4		W141401	TJK	10/19/11 09:57	
EPA 6010B	Arsenic	52.6	mg/kg	2.5	0.4		W141401	TJK	10/19/11 09:57	
EPA 6010B	Barium	27.4	mg/kg	0.200	0.024		W141401	TJK	10/19/11 09:56	
EPA 6010B	Cadmium	< 0.20	mg/kg	0.20	0.02		W141401	TJK	10/19/11 09:56	
EPA 6010B	Chromium	2.21	mg/kg	0.60	0.05		W141401	TJK	10/19/11 09:57	
EPA 6010B	Copper	13.8	mg/kg	1.00	0.21		W141401	TJK	10/19/11 09:56	
EPA 6010B	Iron	16800	mg/kg	6.0	1.1		W141401	TJK	10/19/11 09:55	
EPA 6010B	Lead	63.6	mg/kg	0.75	0.21		W141401	TJK	10/19/11 09:57	
EPA 6010B	Manganese	19.6	mg/kg	0.40	0.04		W141401	TJK	10/19/11 09:55	
EPA 6010B	Selenium	< 4.0	mg/kg	4.0	1.2		W141401	TJK	10/19/11 09:57	
EPA 6010B	Silver	1.94	mg/kg	0.50	0.04		W141401	TJK	10/19/11 09:56	
EPA 6010B	Zinc	24.4	mg/kg	1.00	0.09		W141401	TJK	10/19/11 09:57	
EPA 7471A	Mercury	1.02	mg/kg	0.033	0.007		W142105	JAA	10/11/11 13:18	
Percent Solids										
Percent Solids	% Solids	97.8	%	0.1			W141402	DP	10/10/11 12:23	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



One Government Gulch - PO Box 929

Kellogg ID 83837-0929

(208) 784-1258

Fax (208) 783-0891

IDEQ (Boise)
1410 N. Hilton
Boise, ID 83706

Project Name: Boise
Work Order: **W1J0149**
Reported: 19-Oct-11 15:13

Client Sample ID: **MKBG1SS1**

SVL Sample ID: **W1J0149-07 (Soil)**

Sample Report Page 1 of 1

Sampled: 21-Sep-11 11:40
Received: 06-Oct-11
Sampled By: TE

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total) by EPA 6000/7000 Methods										
EPA 6010B	Antimony	< 2.0	mg/kg	2.0	0.4		W141401	TJK	10/19/11 10:02	
EPA 6010B	Arsenic	5.4	mg/kg	2.5	0.4		W141401	TJK	10/19/11 10:02	
EPA 6010B	Barium	194	mg/kg	0.200	0.024		W141401	TJK	10/19/11 10:01	
EPA 6010B	Cadmium	< 0.20	mg/kg	0.20	0.02		W141401	TJK	10/19/11 10:01	
EPA 6010B	Chromium	17.3	mg/kg	0.60	0.05		W141401	TJK	10/19/11 10:01	
EPA 6010B	Copper	11.6	mg/kg	1.00	0.21		W141401	TJK	10/19/11 10:01	
EPA 6010B	Iron	23400	mg/kg	6.0	1.1		W141401	TJK	10/19/11 10:00	
EPA 6010B	Lead	9.81	mg/kg	0.75	0.21		W141401	TJK	10/19/11 10:02	
EPA 6010B	Manganese	620	mg/kg	0.40	0.04		W141401	TJK	10/19/11 10:00	
EPA 6010B	Selenium	< 4.0	mg/kg	4.0	1.2		W141401	TJK	10/19/11 10:02	
EPA 6010B	Silver	< 0.50	mg/kg	0.50	0.04		W141401	TJK	10/19/11 10:01	
EPA 6010B	Zinc	45.1	mg/kg	1.00	0.09		W141401	TJK	10/19/11 10:01	
EPA 7471A	Mercury	0.037	mg/kg	0.033	0.007		W142105	JAA	10/11/11 13:20	
Percent Solids										
Percent Solids	% Solids	98.2	%	0.1			W141402	DP	10/10/11 12:23	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



IDEQ (Boise)
1410 N. Hilton
Boise, ID 83706

Project Name: Boise
Work Order: **W1J0149**
Reported: 19-Oct-11 15:13

Client Sample ID: **WAAD1SW1**

SVL Sample ID: **W1J0149-08 (Surface Water)**

Sample Report Page 1 of 1

Sampled: 22-Sep-11 13:11
Received: 06-Oct-11
Sampled By: TE

Method	Analyte	Result	Units	RL	MDL	Dilution	Batch	Analyst	Analyzed	Notes
Metals (Total)										
EPA 7470A	Mercury	< 0.00020	mg/L	0.00020	0.000072		W142267	JAA	10/17/11 13:26	
Metals (Total Recoverable)										
EPA 6010B	Antimony	< 0.020	mg/L	0.020	0.005		W142013	TJK	10/19/11 12:33	
EPA 6010B	Arsenic	< 0.025	mg/L	0.025	0.007		W142013	TJK	10/19/11 12:33	
EPA 6010B	Barium	0.0423	mg/L	0.0020	0.0004		W142013	TJK	10/19/11 12:33	
EPA 6010B	Cadmium	< 0.0020	mg/L	0.0020	0.0005		W142013	TJK	10/19/11 12:33	
EPA 6010B	Chromium	< 0.0060	mg/L	0.0060	0.0006		W142013	TJK	10/19/11 12:33	
EPA 6010B	Copper	< 0.010	mg/L	0.010	0.003		W142013	TJK	10/19/11 12:33	
EPA 6010B	Iron	0.912	mg/L	0.060	0.017		W142013	TJK	10/19/11 12:32	
EPA 6010B	Lead	< 0.0075	mg/L	0.0075	0.0034		W142013	TJK	10/19/11 12:33	
EPA 6010B	Manganese	0.136	mg/L	0.0040	0.0011		W142013	TJK	10/19/11 12:32	
EPA 6010B	Selenium	< 0.040	mg/L	0.040	0.009		W142013	TJK	10/19/11 12:33	
EPA 6010B	Silver	< 0.0050	mg/L	0.0050	0.0005		W142013	TJK	10/19/11 12:33	
EPA 6010B	Zinc	< 0.0100	mg/L	0.0100	0.0021		W142013	TJK	10/19/11 12:33	

This data has been reviewed for accuracy and has been authorized for release by the Laboratory Director or designee.

John Kern
Laboratory Director



IDEQ (Boise)
1410 N. Hilton
Boise, ID 83706

Project Name: Boise
Work Order: **W1J0149**
Reported: 19-Oct-11 15:13

Quality Control - BLANK Data

Method	Analyte	Units	Result	MDL	MRL	Batch ID	Analyzed	Notes
--------	---------	-------	--------	-----	-----	----------	----------	-------

Metals (Total)

EPA 7470A	Mercury	mg/L	<0.00020	0.000072	0.00020	W142267	17-Oct-11	
-----------	---------	------	----------	----------	---------	---------	-----------	--

Metals (Total) by EPA 6000/7000 Methods

EPA 6010B	Antimony	mg/kg	<2.0	0.4	2.0	W141401	19-Oct-11	
EPA 6010B	Arsenic	mg/kg	<2.5	0.4	2.5	W141401	19-Oct-11	
EPA 6010B	Barium	mg/kg	<0.200	0.024	0.200	W141401	19-Oct-11	
EPA 6010B	Cadmium	mg/kg	<0.20	0.02	0.20	W141401	19-Oct-11	
EPA 6010B	Chromium	mg/kg	<0.60	0.05	0.60	W141401	19-Oct-11	
EPA 6010B	Copper	mg/kg	<1.00	0.21	1.00	W141401	19-Oct-11	
EPA 6010B	Iron	mg/kg	<6.0	1.1	6.0	W141401	19-Oct-11	
EPA 6010B	Lead	mg/kg	<0.75	0.21	0.75	W141401	19-Oct-11	
EPA 6010B	Manganese	mg/kg	<0.40	0.04	0.40	W141401	19-Oct-11	
EPA 6010B	Selenium	mg/kg	<4.0	1.2	4.0	W141401	19-Oct-11	
EPA 6010B	Silver	mg/kg	<0.50	0.04	0.50	W141401	19-Oct-11	
EPA 6010B	Zinc	mg/kg	<1.00	0.09	1.00	W141401	19-Oct-11	
EPA 7471A	Mercury	mg/kg	<0.033	0.007	0.033	W142105	11-Oct-11	

Metals (Total Recoverable)

EPA 6010B	Antimony	mg/L	<0.020	0.005	0.020	W142013	19-Oct-11	
EPA 6010B	Arsenic	mg/L	<0.025	0.007	0.025	W142013	19-Oct-11	
EPA 6010B	Barium	mg/L	<0.0020	0.0004	0.0020	W142013	19-Oct-11	
EPA 6010B	Cadmium	mg/L	<0.0020	0.0005	0.0020	W142013	19-Oct-11	
EPA 6010B	Chromium	mg/L	<0.0060	0.0006	0.0060	W142013	19-Oct-11	
EPA 6010B	Copper	mg/L	<0.010	0.003	0.010	W142013	19-Oct-11	
EPA 6010B	Iron	mg/L	<0.060	0.017	0.060	W142013	19-Oct-11	
EPA 6010B	Lead	mg/L	<0.0075	0.0034	0.0075	W142013	19-Oct-11	
EPA 6010B	Manganese	mg/L	<0.0040	0.0011	0.0040	W142013	19-Oct-11	
EPA 6010B	Selenium	mg/L	<0.040	0.009	0.040	W142013	19-Oct-11	
EPA 6010B	Silver	mg/L	<0.0050	0.0005	0.0050	W142013	19-Oct-11	
EPA 6010B	Zinc	mg/L	<0.0100	0.0021	0.0100	W142013	19-Oct-11	

Quality Control - LABORATORY CONTROL SAMPLE Data

Method	Analyte	Units	LCS Result	LCS True	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes
--------	---------	-------	------------	----------	--------	-------------------	----------	----------	-------

Metals (Total)

EPA 7470A	Mercury	mg/L	0.00527	0.00500	105	80 - 120	W142267	17-Oct-11	
-----------	---------	------	---------	---------	-----	----------	---------	-----------	--

Metals (Total) by EPA 6000/7000 Methods

EPA 6010B	Antimony	mg/kg	95.0	100	95.0	80 - 120	W141401	19-Oct-11	
EPA 6010B	Arsenic	mg/kg	91.5	100	91.5	80 - 120	W141401	19-Oct-11	
EPA 6010B	Barium	mg/kg	101	100	101	80 - 120	W141401	19-Oct-11	
EPA 6010B	Cadmium	mg/kg	96.1	100	96.1	80 - 120	W141401	19-Oct-11	
EPA 6010B	Chromium	mg/kg	101	100	101	80 - 120	W141401	19-Oct-11	
EPA 6010B	Copper	mg/kg	96.3	100	96.3	80 - 120	W141401	19-Oct-11	
EPA 6010B	Iron	mg/kg	995	1000	99.5	80 - 120	W141401	19-Oct-11	
EPA 6010B	Lead	mg/kg	96.2	100	96.2	80 - 120	W141401	19-Oct-11	
EPA 6010B	Manganese	mg/kg	100	100	100	80 - 120	W141401	19-Oct-11	
EPA 6010B	Selenium	mg/kg	89.6	100	89.6	80 - 120	W141401	19-Oct-11	
EPA 6010B	Silver	mg/kg	4.98	5.00	99.6	80 - 120	W141401	19-Oct-11	
EPA 6010B	Zinc	mg/kg	94.8	100	94.8	80 - 120	W141401	19-Oct-11	
EPA 7471A	Mercury	mg/kg	0.902	0.833	108	80 - 120	W142105	11-Oct-11	

Metals (Total Recoverable)

EPA 6010B	Antimony	mg/L	1.04	1.00	104	80 - 120	W142013	19-Oct-11	
-----------	----------	------	------	------	-----	----------	---------	-----------	--

SVL holds the following certifications:

AZ:0538, CA:2080, FL(NELAC):E87993, ID:ID00019 & ID00965 (Microbiology), NV:ID000192007A, WA:1268



IDEQ (Boise) 1410 N. Hilton Boise, ID 83706	Project Name: Boise Work Order: W1J0149 Reported: 19-Oct-11 15:13
---	---

Quality Control - LABORATORY CONTROL SAMPLE Data (Continued)									
Method	Analyte	Units	LCS Result	LCS True	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes

Metals (Total Recoverable) (Continued)

EPA 6010B	Arsenic	mg/L	1.02	1.00	102	80 - 120	W142013	19-Oct-11	
EPA 6010B	Barium	mg/L	1.02	1.00	102	80 - 120	W142013	19-Oct-11	
EPA 6010B	Cadmium	mg/L	1.04	1.00	104	80 - 120	W142013	19-Oct-11	
EPA 6010B	Chromium	mg/L	1.05	1.00	105	80 - 120	W142013	19-Oct-11	
EPA 6010B	Copper	mg/L	0.951	1.00	95.1	80 - 120	W142013	19-Oct-11	
EPA 6010B	Iron	mg/L	10.5	10.0	105	80 - 120	W142013	19-Oct-11	
EPA 6010B	Lead	mg/L	1.03	1.00	103	80 - 120	W142013	19-Oct-11	
EPA 6010B	Manganese	mg/L	1.05	1.00	105	80 - 120	W142013	19-Oct-11	
EPA 6010B	Selenium	mg/L	1.08	1.00	108	80 - 120	W142013	19-Oct-11	
EPA 6010B	Silver	mg/L	0.0521	0.0500	104	80 - 120	W142013	19-Oct-11	
EPA 6010B	Zinc	mg/L	1.05	1.00	105	80 - 120	W142013	19-Oct-11	

Quality Control - MATRIX SPIKE Data										
Method	Analyte	Units	Spike Result	Sample Result (R)	Spike Level (S)	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes

Metals (Total)

EPA 7470A	Mercury	mg/L	0.00098	<0.00020	0.00100	98.0	75 - 125	W142267	17-Oct-11	
-----------	---------	------	---------	----------	---------	------	----------	---------	-----------	--

Metals (Total) by EPA 6000/7000 Methods

EPA 6010B	Antimony	mg/kg	55.9	<2.0	100	55.9	75 - 125	W141401	19-Oct-11	M2
EPA 6010B	Arsenic	mg/kg	113	20.7	100	92.7	75 - 125	W141401	19-Oct-11	
EPA 6010B	Barium	mg/kg	205	105	100	100	75 - 125	W141401	19-Oct-11	
EPA 6010B	Cadmium	mg/kg	95.3	0.30	100	95.0	75 - 125	W141401	19-Oct-11	
EPA 6010B	Chromium	mg/kg	128	28.2	100	99.3	75 - 125	W141401	19-Oct-11	
EPA 6010B	Copper	mg/kg	112	11.7	100	100	75 - 125	W141401	19-Oct-11	
EPA 6010B	Iron	mg/kg	32800	30800	1000	R > 4S	75 - 125	W141401	19-Oct-11	M3
EPA 6010B	Lead	mg/kg	100	5.69	100	94.6	75 - 125	W141401	19-Oct-11	
EPA 6010B	Manganese	mg/kg	1950	1960	100	R > 4S	75 - 125	W141401	19-Oct-11	M3
EPA 6010B	Selenium	mg/kg	95.8	4.6	100	91.2	75 - 125	W141401	19-Oct-11	
EPA 6010B	Silver	mg/kg	4.98	<0.50	5.00	99.6	75 - 125	W141401	19-Oct-11	
EPA 6010B	Zinc	mg/kg	146	52.1	100	93.7	75 - 125	W141401	19-Oct-11	
EPA 7471A	Mercury	mg/kg	0.425	0.263	0.167	97.0	70 - 130	W142105	11-Oct-11	

Metals (Total Recoverable)

EPA 6010B	Antimony	mg/L	1.05	<0.020	1.00	105	75 - 125	W142013	19-Oct-11	
EPA 6010B	Arsenic	mg/L	1.04	<0.025	1.00	104	75 - 125	W142013	19-Oct-11	
EPA 6010B	Barium	mg/L	1.14	0.113	1.00	103	75 - 125	W142013	19-Oct-11	
EPA 6010B	Cadmium	mg/L	1.04	<0.0020	1.00	104	75 - 125	W142013	19-Oct-11	
EPA 6010B	Chromium	mg/L	1.06	<0.0060	1.00	106	75 - 125	W142013	19-Oct-11	
EPA 6010B	Copper	mg/L	0.975	<0.010	1.00	96.6	75 - 125	W142013	19-Oct-11	
EPA 6010B	Iron	mg/L	10.7	<0.060	10.0	107	75 - 125	W142013	19-Oct-11	
EPA 6010B	Lead	mg/L	1.03	<0.0075	1.00	103	75 - 125	W142013	19-Oct-11	
EPA 6010B	Manganese	mg/L	1.07	<0.0040	1.00	107	75 - 125	W142013	19-Oct-11	
EPA 6010B	Selenium	mg/L	1.09	<0.040	1.00	109	75 - 125	W142013	19-Oct-11	
EPA 6010B	Silver	mg/L	0.0533	<0.0050	0.0500	107	75 - 125	W142013	19-Oct-11	
EPA 6010B	Zinc	mg/L	1.05	<0.0100	1.00	105	75 - 125	W142013	19-Oct-11	



IDEQ (Boise) 1410 N. Hilton Boise, ID 83706	Project Name: Boise Work Order: W1J0149 Reported: 19-Oct-11 15:13
---	---

Quality Control - MATRIX SPIKE DUPLICATE Data										
Method	Analyte	Units	MSD Result	Spike Result	Spike Level	RPD	RPD Limit	Batch ID	Analyzed	Notes

Metals (Total)

EPA 7470A	Mercury	mg/L	0.00101	0.00098	0.00100	3.0	20	W142267	17-Oct-11	
-----------	---------	------	---------	---------	---------	-----	----	---------	-----------	--

Metals (Total) by EPA 6000/7000 Methods

EPA 6010B	Antimony	mg/kg	55.0	55.9	100	1.5	20	W141401	19-Oct-11	
EPA 6010B	Arsenic	mg/kg	110	113	100	2.6	20	W141401	19-Oct-11	
EPA 6010B	Barium	mg/kg	205	205	100	0.0	20	W141401	19-Oct-11	
EPA 6010B	Cadmium	mg/kg	96.2	95.3	100	1.0	20	W141401	19-Oct-11	
EPA 6010B	Chromium	mg/kg	127	128	100	0.1	20	W141401	19-Oct-11	
EPA 6010B	Copper	mg/kg	110	112	100	2.1	20	W141401	19-Oct-11	
EPA 6010B	Iron	mg/kg	30900	32800	1000	6.0	20	W141401	19-Oct-11	
EPA 6010B	Lead	mg/kg	99.7	100	100	0.6	20	W141401	19-Oct-11	
EPA 6010B	Manganese	mg/kg	1860	1950	100	4.9	20	W141401	19-Oct-11	
EPA 6010B	Selenium	mg/kg	96.2	95.8	100	0.5	20	W141401	19-Oct-11	
EPA 6010B	Silver	mg/kg	5.02	4.98	5.00	0.8	20	W141401	19-Oct-11	
EPA 6010B	Zinc	mg/kg	144	146	100	1.5	20	W141401	19-Oct-11	
EPA 7471A	Mercury	mg/kg	0.382	0.425	0.167	10.7	20	W142105	11-Oct-11	

Metals (Total Recoverable)

EPA 6010B	Antimony	mg/L	1.05	1.05	1.00	0.4	20	W142013	19-Oct-11	
EPA 6010B	Arsenic	mg/L	1.04	1.04	1.00	0.8	20	W142013	19-Oct-11	
EPA 6010B	Barium	mg/L	1.13	1.14	1.00	0.9	20	W142013	19-Oct-11	
EPA 6010B	Cadmium	mg/L	1.03	1.04	1.00	0.9	20	W142013	19-Oct-11	
EPA 6010B	Chromium	mg/L	1.06	1.06	1.00	0.7	20	W142013	19-Oct-11	
EPA 6010B	Copper	mg/L	0.973	0.975	1.00	0.3	20	W142013	19-Oct-11	
EPA 6010B	Iron	mg/L	10.5	10.7	10.0	1.5	20	W142013	19-Oct-11	
EPA 6010B	Lead	mg/L	1.02	1.03	1.00	0.7	20	W142013	19-Oct-11	
EPA 6010B	Manganese	mg/L	1.06	1.07	1.00	1.2	20	W142013	19-Oct-11	
EPA 6010B	Selenium	mg/L	1.08	1.09	1.00	0.6	20	W142013	19-Oct-11	
EPA 6010B	Silver	mg/L	0.0529	0.0533	0.0500	0.8	20	W142013	19-Oct-11	
EPA 6010B	Zinc	mg/L	1.04	1.05	1.00	1.1	20	W142013	19-Oct-11	

Quality Control - POST DIGESTION SPIKE Data										
Method	Analyte	Units	Spike Result	Sample Result (R)	Spike Level (S)	% Rec.	Acceptance Limits	Batch ID	Analyzed	Notes

Metals (Total) by EPA 6000/7000 Methods

EPA 6010B	Antimony	mg/kg	88.0	<2.0	100	88.0	75 - 125	W141401	19-Oct-11	
-----------	----------	-------	------	------	-----	------	----------	---------	-----------	--



IDEQ (Boise)
1410 N. Hilton
Boise, ID 83706

Project Name: Boise
Work Order: **W1J0149**
Reported: 19-Oct-11 15:13

Notes and Definitions

M2	Matrix spike recovery was low, but the LCS recovery was acceptable.
M3	The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to spike level. The LCS was acceptable.
LCS	Laboratory Control Sample (Blank Spike)
RPD	Relative Percent Difference
UDL	A result is less than the detection limit
R > 4S	% recovery not applicable, sample concentration more than four times greater than spike level
<RL	A result is less than the reporting limit
MRL	Method Reporting Limit
MDL	Method Detection Limit
N/A	Not Applicable
